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Coast Artillery Training

By COLONEL J. B. MITCHELL, C. A. C.

EDITOR'S NOTE: Colonel Mitchell is in charge of the Training Section in the Office of the Chief of Coast Artillery, and as such is especially well qualified to speak on this subject. The remarks published below have been extracted from a lecture recently delivered by him at the Coast Artillery School. They constitute a most comprehensive and up-to-date summary of the important subject of training.

IN T. R. 10-5, Doctrines, Principles, and Methods, troop training for the Army as a whole is defined as: "Troop training is the preparation of individuals and units for battle, and involves study, drill, practical application, educational, vocational, recreational, and moral training. It is a function of command."

The Coast Artillery Corps should follow as closely as possible the lines indicated in the above definition of troop training as it is essential that our training be modeled after that of the army in general, only deviating from it when it is necessary to give instruction, the character of which pertains solely to our Corps. In other words, we should speak the universal training language of the army. This idea is being carried out in the preparation of current training regulations under the direction of the Chief of Coast Artillery; as an example, the term "fire command" is about to be eliminated from our service and the term "group" substituted for it; and further, the term "coast defense command" is also being relegated to the past and in its place is being substituted "harbor defense." This change in terminology brings us closer to the rest of the army and links us in more satisfactory manner to the positive system of coast defense.

The elements of Coast Artillery training are of great diversity and of necessity must be divided into several different categories. It

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has therefore been recommended to the War Department, for inclusion in a pamphlet entitled "Training Requirements," that all Coast Artillery training be divided into four training groups depending upon the class of targets fired upon.

Training Group No. 1.—This consists of all harbor defense, railway, and heavy tractor artillery units.

Training Group No. 2.—This consists of all antiaircraft artillery units.

Training Group No. 3.—This consists of all trench mortar artillery units. This class of artillery has a special mission of firing on land targets from prepared positions within trenches during operations of field armies.

Training Group No. 4.—This consists of all sound ranging artillery units. This class of artillery has a special mission of procuring data concerning the location of vessels by means of subaqueous sound ranging installations and of air and land targets by means of land sound ranging installations, especially those connected with antiaircraft artillery units.

Training is again divided into individual and unit training and the Office of the Chief of Coast Artillery has recommended to the War Department, to be included in the above mentioned pamphlet, the following method of handling individual and unit training of the Coast Artillery soldier:

Individual Training.—The individual training is to be divided into two categories. First, the recruit training of the individual soldier in all subjects common to training groups (1), (2), (3), and (4). This training consists of instructing the individual soldier in the rudiments of discipline, and how to care for himself while on field service; and in addition, it teaches him certain fundamental military acts and operations which are common to all training groups. The training is to be carried out under the direct control of the regimental commander, supervised by the regimental executive, according to a prearranged program of training. Recruits undergoing this training will not be assigned to units nor receive any other class of training nor be given any other duties until their graduation from the individual recruit training class. Second, the advanced individual training. When recruits have progressed to other training they will be assigned to batteries and their individual training as members of the teams composing the several tactical and administrative sections of the battery will take place. The individ-

ual soldier will also, in his battery, be given individual training in certain technical duties to fit him for the positions of technician or of key man. The recruit period of individual training should occupy a period of about three months and individual training for battery team work should occupy a period of about six months. The higher individual training as technician or key man, such as radio operators, engine runners, plotters, gun commanders, gun pointers, casemate electricians, etc., should require another period of six months and should complete this division of training.

The agencies for giving this instruction to the individual soldier other than routine drills are:

a. The recruit instruction schools. b. The battery troop schools. c. The post educational and vocational schools. d. The enlisted men's division of our special service school at Fort Monroe.

Unit Training.—Unit training is of necessity divided into the four training groups given above. Each training group is further subdivided into similar groups corresponding to the sections into which each battery of the regiment is divided for tactical and administrative purposes by pertinent training regulations. As an example, let us consider an antiaircraft regiment. The unit training is divided into the following groups: Headquarters battery, service battery, searchlight battery, gun battery, and machine gun battery. Each one of these groups is subdivided into the sections of the individual battery as, for example, the headquarters battery which is divided into the headquarters detail, observation and orientation detail, communications detail, and maintenance detail. The time consumed for unit training should be the entire training year.

War Department Training Directive.—Under present conditions the annual training directive of the War Department makes its appearance in December in the form of a circular letter to all Corps Area commanders, branch chiefs, and other interested parties. Accompanying it last December, and issued as a training directive for the year 1925, was a letter from the Chief of the Training Section of the General Staff to the Chief of Staff, giving a summary of the performances of the past training year and the recommendations for future improvements. The War Department Training Directive gives, each year, the missions for the different component parts of the army and goes into detail as to the proper methods to be pursued to accomplish these missions. The Training Directive itself contains detailed information relative to the training of the regular army, while that for the training of the National Guard is

contained in a training directive issued, pursuant to a policy of the War Department, by the Chief of Militia Bureau. Information relative to the training of the Organized Reserves is contained in the training directive of the War Department itself, and that pertaining to the training of the R. O. T. C. and C. M. T. C. activities is contained in separate directives.

It is well for regimental plans and training officers to procure and bind together for ready reference the following, pertaining to training for the calendar year, 1925:

Training Year, 1925 (letter AG 353, 11-17-24).

General Orders No. 35, War Department, November 28, 1924.

Basic Training Directive, National Guard, Training Year 1924-1925 (Operations and Training Division, G-3).

Consolidated Report of Tactical and Training Inspections (AG 333.3 (11-17-24) (Misc.) (M-C).

C. M. T. C. Training Program, 1925 (AG 354.1, 1-7-25) (Misc.) (M-C), (dated 1-9-25).

R. O. T. C. Camp Programs for summer 1925 (AG 354.17 R. O. T. C.) (1-31-25) Misc. (C), dated February 12, 1925).

Officers' and Enlisted Men's Schools.—One of the most important duties of an officer of our Corps is that of instructor in the different classes of schools which are held in all of our regiments. These schools are known as troop schools and post schools, definitions of which are given in T. R. 10-5, "Doctrines, Principles, and Methods." The troops schools for officers and enlisted men are described in General Order No. 112, War Department, 1919, and for officers consists of the basic course and advanced courses. The basic course is constituted to give instruction to the newly appointed officers in certain fundamental subjects which are essential to the proper performance of their duties upon joining their regiments. This school is conducted according to instructions contained in a circular letter from the War Department under date of September 30, 1922. The advanced unit school is, in most Coast Artillery regiments, divided into two parts. First, a course in artillery materiel, training regulations, and gunnery in which special attention is paid to theoretical and practical instruction in the adjustment of fire; and second, a course for officers who have completed the basic course and the first part of the advanced course, in subjects bearing upon the tactical duties of the regimental officer. This latter course usually consists of work pertaining to the solution of problems for the seaward and landward defense of harbor defenses, the employment of antiaircraft and railway regiments with field armies, and the employment of heavy tractor and railway regiments

for beach defense between harbor defenses. There may be included a study of Field Service Regulations, and of certain texts from the General Service School at Fort Leavenworth pertaining to the estimate of the situation and the preparation of field orders, especial attention being paid to their use by harbor defense artillerymen. In most Coast Artillery Districts, officers in these schools are required to solve not more than three tactical problems each year; to write papers on current military subjects; and in some Coast Artillery districts, to take part in public speaking.

The schools for enlisted men in the regiments will consist of regimental schools for recruit training, and theoretical and practical troop schools. These latter will be conducted by individual batteries, or possibly collectively by battalion or regiment and they will give instruction in the subjects required for the preparation of enlisted men to take their places in the tactical combat teams, and also to become technicians and key men.

The vocational side of the post schools described in A. R. 350-2505 is very difficult to conduct along scientific lines. There have been prepared in the War Department, training manuals covering all vocational courses taught in these post schools, but, unfortunately, it has been my experience as a training inspector of our regiments, to find that the instruction is not carried out according to the scientific methods of training laid down in these manuals, nor, in many cases, are the desired results forthcoming from these schools. It is essential that these vocational schools should turn out sufficient men to fill all the technical operative positions in the regiment or harbor defense, and they should, in addition, train a reserve of men for all positions. It must be remembered that enlisted specialists of the Coast Artillery noncommissioned staff are instructors, supervisors, and overseers but not operators. These operators, such as gas engine runners, motor mechanics, and radio operators are men trained in the vocational schools. Recent inspections have shown that this condition does not prevail, and I have seen master sergeants start 25-K.W. sets, no privates having been trained in this duty. This is a state of affairs which would not exist in the Coast Artillery today, were the vocational side of the post schools functioning properly. Troop schools under battery commanders should turn out well trained noncommissioned officers and also a reserve of privates ready to fill vacancies as they occur, so that a unit may be called upon at any time to function with efficiency in the duties prescribed for it. In some commands, in order to standardize training, Coast Artillery District Schools have been installed and operated with great efficiency.

Tactical Training.—Another matter pertaining to troop training is that of the tactical operation of the different classes of Coast Artillery. In taking up this subject we must always bear in mind, regardless of whether we are harbor defense artillerymen, or anti-aircraft artillerymen, that we must look at tactical employment from the same viewpoint as an infantryman or a cavalryman. If we are harbor defense artillerymen we must think of lines of communication and intelligence, not alone as laid down in the orthodox fire control diagram of old, but also as along the lines of signal communications for all arms. In our tactical problems involving harbor defense, employed in resisting the attack of hostile ships, we must frame our orders, both tactical and administrative, along the lines laid down in the training literature of the General Service Schools. The harbor defense commander, while actively engaged in directing the operations of his force should not think of himself as sitting in the C' station of old, but as being installed in a modern command post, similar to that of a division in a field army, in which he has his well organized operations section, wherein he notes the position of the army from the time war is declared until he comes within range of his guns, and where he also has well organized intelligence and message centers. The anti-aircraft artilleryman must be prepared to solve tactical problems incident to the employment of his regiment or brigade as a part of corps and armies. He must be familiar with the powers and limitations of his armament, its mobility and its correct tactical employment in all conditions of field warfare. Regular officers of our service must be able to instruct the field and staff officers of the National Guard and Organized Reserve regiments in their tactical duties during summer camps. At the conferences held after maneuvers they must be able to get on their feet and state in plain, concise and correct language what the mission of their unit was and what they accomplished; and finally, to give constructive recommendations for changes in policies of tactical employment laid down in training regulations. It is only by the careful testing out of training regulations during field firings, tactical exercises and maneuvers that we may obtain material for revising our training regulations and thus keep them abreast of the times.

Let us consider for a moment the construction of training directives, schedules, and proficiency tests. One of the most difficult parts of troop training is the preparing of comprehensive and intelligent training programs and schedules, and reports of proficiency. When a recent graduate of the Coast Artillery School joins his regiment he may be made plans and training officer. This

position to my mind is probably the most important staff job on the regimental team. His colonel will expect of him, as a recent graduate of the school, the latest word in everything pertaining to training. The colonel may turn over to him the Corps Area Commander's and Artillery District Commander's directives and he may say, "Captain So-and-So, study these instructions on training, and in one week's time give me proof of my annual training order." If the officer knows his job it will be plain sailing and a good program will be forthcoming; he will be able to explain it to the officers in conference and he will be able to watch the results in his training inspections under A. R. 265-10 and to apply the acid test to his units as to their proficiency by means of the annual tactical inspections. On the other hand, if he does not know his subject and is not well versed in methods of training, the result will be, unless his regimental commander takes prompt corrective measures, a poorly prepared training directive.

At Fort Leavenworth, sample training directives have been prepared for Corps Area Commanders, division and other unit commanders. These samples will bear careful study. Our Artillery District Commanders are issuing training directives which are comprehensive, thorough, and of a wide scope in character. They follow the principles enumerated in paragraph 55 of T. R. 10-5 by stating the task to be performed, leaving the manner and method of performing it to the subordinate commander in order that he may use and develop his own initiative. One reaction encountered in making training inspections from the Office of the Chief of Coast Artillery is that some unit commanders believe that they are requested to spend too much time in making out individual and unit reports of proficiency, and in preparing weekly schedules for the benefit of higher officials. My answer to this is that these are necessary evils, and that if the requirements are within reason they are instruments of great good, and accurately indicate the state of proficiency of the unit. Proficiency tables should be posted at all times; those for individuals on barrack bulletin boards in order that the enlisted men may read and see their standing in training matters. In one harbor defense a few years ago a bulletin board was installed in post headquarters, upon which were displayed in graphic form, the monthly results of training. This created great rivalry among the organizations composing the garrison.

Division of Training Year.—We now pass to the question of how to divide the calendar year into the training periods, and what should be the principal training objectives of these several periods. Where climatic conditions are favorable, it is found advisable to

commence the training year about November 1st. By that time changes in personnel for general and special service schools have ceased to upheave the regimental command personnel, and officers and enlisted men have returned from well earned leave after the summer's field training. The year is best divided into four training periods of different durations. From November 1st to about the middle of March or the first of April is usually considered the first training period, in which the principal objective of training is the theoretical instruction of the enlisted personnel for whose benefit during this period troop and post schools are held. It is also the time for holding schools for the officer personnel and for working upon mobilization plans and harbor defense plans. During this time of the year gunners' instruction should be held and gunners' examinations completed and results announced. Small arms preliminary training may take place to advantage during this period.

It must not be considered that this is an indoor period; it is not, and the only time in which indoor instruction should be given, except in schools, is when the weather is not propitious for outdoor troop training.

The second period should begin about the 15th of March or as soon thereafter as weather conditions will permit and should end only at such time as is necessary to commence the field training of the civilian components of the army. During this period the main objective should be intensive artillery training leading up to the solution of tactical field exercise and problems, and the holding of artillery target practice. The period should end with tactical and training inspections by superior officers pursuant to the provisions of A. R. 265-10.

The third period should continue only during the time as is necessary to train the civilian components of the army, and should, if possible, not exceed two months' duration. Unfortunately, this is not always possible, owing to the small number of existing training centers and the large number of units to be trained. This frequently results in too large a groupment of Organized Reserve and National Guard units at one training center. The length of this period is also influenced by the fact that funds sometimes become available for training near the end of the fiscal year, which of necessity, tends to prolong it. During this period well organized and instructed regular demonstrating units trained in the preceding period, should be present to demonstrate all classes of training to National Guard and Organized Reserve units. The excellent performance of trained demonstrating teams in gun drill, fire control work, searchlight operation, disciplinary drill or athletics consti-

tutes excellent object lessons for those whose only practical training other than their summer encampment period is a few nights per year in an armory. Regular officers should be available to train Reserve units in all departments of every character of artillery work. It must be remembered that the commanders of all harbor defenses will have a large proportion of their war force made up of National Guard and Organized Reserve units and that the golden time to train these units is during the annual summer encampment periods.

The fourth period usually covers the work of September and October of each year and is devoted to small arms instructions and the completion of work not carried out in the preceding periods.

Inspections.—Inspections of all commands are of two classes—training and tactical. Training inspections are made by officers of the training branch of the General Staff, representatives of the Chief of Coast Artillery, and by Coast Artillery District and subordinate commanders. Inspections of this character are for the purpose of determining whether training directives are in accordance with War Department policies as contained in the Annual War Department Training Directive, whether they are suitable for the training status of the unit in question, in what manner they are being carried out, and whether or not the instructing force is efficient. Mileage permitting, it is the policy of the Chief of Coast Artillery to have an officer of the Training Section of his office, inspect every regular unit once a year. It is by means of these inspections that the Chief of Coast Artillery is able to form an estimate as to the excellence of training of the regiments of the Corps.

Tactical inspections are held by superior commanders for all units commencing with the battalion commands and are for the purpose of determining, in general term, the condition of the command for active field service, and the state of efficiency of the individual officers and of the enlisted men. These inspections are the acid tests through which individual officers and units must pass in order to determine the fighting proficiency of the individual and the unit.

Present Status of Training.—The Chief of Coast Artillery determines the present status of training in all of the regiments of the Corps by means of training inspection reports made by his representatives and by the additional means of studying Coast Artillery target practice reports, reports of tactical inspections of superior commanders submitted to the War Department, and the reports of the Inspector General's Department covering matters of administration, discipline, and condition of materiel. From inspections and studies made in the Office of the Chief of Coast Artillery the present

status of the training of the regiments of our Corps may be summed up in a few words, as follows:

Regimental training throughout the Corps is generally satisfactory. The morale of the officers and enlisted men is with few exceptions high. Where training conditions are found to be unsatisfactory, it is generally due to one or more of the following causes:

a. The shortage of commissioned and enlisted personnel made necessary by the present size of the Coast Artillery Corps.

b. The drafting from active units of sufficient specialized personnel to maintain in required condition seacoast armament which is out of service.

c. The lack of funds for the procurement of certain training material, especially artillery boats for harbor defense artillery, and spare parts of vehicles for mobile artillery.

d. The large amount of work of non-artillery character required of all commands for the maintaining of post activities.

Amongst the defects noted at recent training inspections might be mentioned the following:

a. In harbor defenses the lack of well organized command posts from which harbor defense, fort, and group commanders may exercise tactical command.

b. The absence of well trained spotting details in the fire control section of certain firing batteries.

c. The failure to use ballistic wind data at many firings,

d. The inability of certain officers to make correctly and expeditiously an estimate of the situation and to write correct orders during the solution of tactical problems.

e. The poor training of communications details in all classes of artillery units.

f. The lack of well trained men for key positions in fire control sections.

g. The absence of substitutes for key positions, thereby causing team work to break down until a new man can be trained.

h. The lack of knowledge of officers and enlisted men of our training regulations and the failure to place copies of such regulations in the hands of the noncommissioned officers and selected privates.

Contents of Training Regulations.—Officers assuming regimental duties should have an intimate knowledge of all training regulations especially those pertaining to the tactical control of the different classes of Coast Artillery. They should have an intimate knowledge of the latest fire control equipment. They should be able to make proper adjustments of fire at all classes of target practice. They should be able to analyze a target practice and should be able to record, in plain language, the results obtained at all firings. They should be able to organize a tactical command post of any character. They should be familiar with the establishment of artillery means of communication and its relation to the communications system for all arms. They should be familiar with the positive system of coast defense. They should be able to prepare mobilization plans and Coast Artillery parts of sector tactical plans. And finally, they should have a knowledge of the powers and limitations of the other combatant branches of the army. They should be familiar with the organization of the army as a whole, the duties of the General Staff, and the policies of the War Department concerning the organization and training of the civilian components of the army.

Officers must realize that the training of Coast Artillery regiments, no matter what their character may be, is similar to and along the same lines as the general training of all branches of the army. Our Corps is but a part of the army and we must efficiently train it in order that the army as a whole may function efficiently, for the defense of the country.

To be prepared for war is one of the most effectual means of preserving peace. A free people ought not only to be armed but disciplined; to which end a uniform and well digested plan is requisite.—George Washington.

The Chain of Command In Coast Defense

By MAJOR R. H. SMITH, C. A. C.

IN BEGINNING this article, let us review what is meant by the terms "Command", "Commander", and "Chain of Command". To be sure that we are all "talking the same language," it will be well to quote a few fundamental axioms which we all know, but sometimes neglect to consider.

1. *Command* is the authority and control which a superior legally exercises over his subordinates. The exercise of command produces individual or collective military action or non-action on the part of the subordinates regardless of the latter's will.

2. The *Commander* of a military force is thus its controlling head. He is responsible to his proper superior for results, for everything his force does, or fails to do, collectively and individually. It follows therefore that the commander must cause his will to be obeyed by each individual member of his force. Experience has proven that the number of subordinates which a single individual can personally control and supervise is extremely limited varying with conditions. How, then, is it possible, as units increase in size and complexity up through the scale of the military hierarchy to the army or groups of armies, for the commander, this single controlling head, to direct effectively the individuals composing his command and cause his will to be obeyed and executed by each individual? It is manifestly impossible for him to do this by direct orders to and personal supervision over each individual. There must be some kind of mechanical framework by means of which the commander dealing directly with only a few subordinates can accomplish the result.

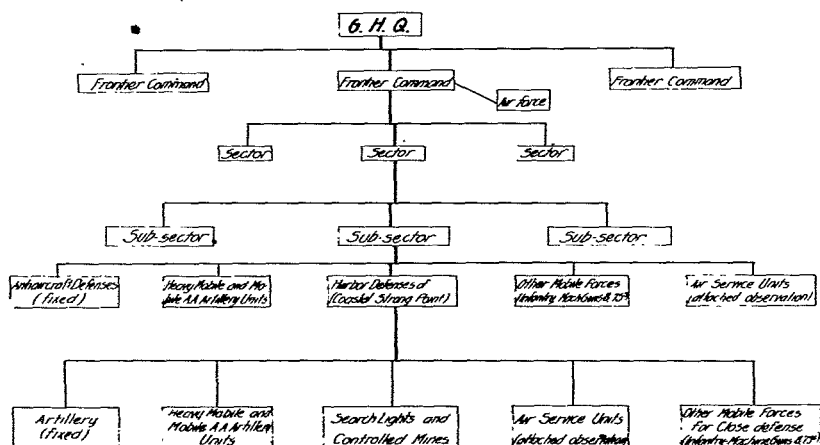
3. This mechanical framework is known as *organization*, i.e., subdivision into successive subordinate groups each under its own commander. Each commander is responsible to his immediate superior for everything his own group, command, or force does or fails to do. Correspondingly he holds his immediate subordinates responsible for the results accomplished by their own groups or commands.

4. The succession of subordinate commanders through whom a commander exercises his authority and control is known as the *Chain of Command*.

5. From the above discussion it is apparent that *command*, *responsibility*, and *organization* are *interdependent*. It is therefore fundamental that true organization is based primarily not only on tactical employment, but upon the necessities of command and responsibility as well. Together they form the foundation and framework without which no military superstructure can stand.

6. It must now be obvious that in every military force there must be a single head who commands it as such and who alone is responsible to his proper superior for results, for all that it does and all that it fails to do. It is his command and he must produce with

DIAGRAM OF TACTICAL CHAIN OF COMMAND IN COAST DEFENSE (ARMY)
(To become effective when "National Position in Readiness" is assumed)



it. This is known as the principle of *unity of command*. Furthermore no unit, group, or individual should have more than one immediate commander, e.g., in an artillery battalion a battery commander directly commands his battery, while the battalion commander should exercise his authority over the battery not directly but *through* the battery commander.

7. The commander of a force must thoroughly understand the powers and limitations of all elements of his command or obviously he cannot intelligently direct it as a tactical team.

8. A commander producing satisfactory results with his force and living within the law must be upheld by his superior; failing to do this, he should be removed.

9. A commander must not infringe on the initiative of his subordinate commander. He will direct him what to do, but not how to do it.

With the foregoing principles in our minds, let us now consider our concrete case, the Chain of Command in Coast Defense. Again, to be sure we are talking the same language, it is necessary to state that the term "coast defense" as used here means defense of the entire coast line or as some authorities call it, the sea frontier. "Coast defense" has sometimes been erroneously used to mean "harbor defense." It is not so used herein. Also this article deals primarily with the coast defense of the continental United States, but the principles enunciated herein will apply equally to our insular possessions.

Coast defense consists of the strategical and tactical dispositions and operations of the land and sea forces of a nation with the object of defeating hostile attacks against any portion of its sea frontier. Specifically the elements that enter into it in this country are the naval forces, the harbor defenses, and the mobile forces of the army. The scope of this article does not include the naval forces.

For command and other purposes the coast line and areas of continental United States contiguous thereto are divided geographically in downward progression into "frontier commands," "sectors," and "subsectors." The limits of the frontier commands and of the sectors are prescribed by the War Department, those of the subsectors by the frontier or sector commanders. Incidentally, in certain cases a frontier command includes both a portion of the sea frontier and the land frontier of the United States, but we are here concerned only with the sea frontier. A frontier command may comprise two or more sectors, which in turn are subdivided into a number of subsectors. These various divisions and subdivisions are all *tactical* commands as well as geographical, and conform to the well recognized principle of the chain referred to above.

Now let us see what we have in these divisions and subdivisions. Coast defense is organized into:

- a. Harbor defenses including landward and beach defenses.
- b. More or less highly organized beach defenses lying between the harbor defenses.
- c. Areas considered impracticable or unprofitable for enemy landings in force. These areas will be kept under observation only.

The frontier commands and sectors of the littoral of continental United States include all three classes of these areas, and subsectors also in general do.

The official document, "Joint Army and Navy Action in Coast Defense," published by our War and Navy Departments, states on page 10: "A defense sector comprises the entire sea frontier within its limits, of which the harbor defenses are strong points and not isolated points to be defended." By analogy the same statement applies to a subsector and harbor defenses lying within its limits.

The Chief of Coast Artillery in a letter to the Adjutant General of this year (1924) even more emphatically states: "The status of a coast defense command (harbor defense) in a sector or subsector should be in no wise that of a kingdom within a kingdom. Rather should it be that of a group or strong point of artillery having certain definite independent missions to perform, at the same time being quite capable of performing other missions, which may assist the sector or subsector commander. In the latter case, the sector or subsector commander should be entirely free to direct the coast defense commander to render such assistance. Under such conditions, however, the sector or subsector commander must assume the responsibility if the response to such a call should affect unfavorably the execution of the independent mission of the coast defense command (harbor defense)."

This is sound and logical and in accordance with the basic principles of command, organization, and responsibility enumerated at the beginning of this article except possibly for the use of the word "independent" for which use the Chief of Coast Artillery has excellent authority, of which more later. However, if we interpret "independent" to mean "special" or "primary" the statement is unexceptionable.

From the foregoing we may logically state that authorities are agreed that if a harbor defense lies within the limits of a subsector command, it is a part of that command. It being a part of that command, the harbor defense commander is subject to the orders of the subsector commander, or in other words, the subsector commander is the immediate superior of the harbor defense commander. Now refer again to the basic principle of unity of command and by incontrovertible logic it is evident the subsector commander must not only be responsible to superior authority for the successful defense of the beaches in his subsector, but also for the successful carrying out of the harbor defense missions within his command. Going down the chain of command, he will hold the commander of a harbor defense responsible for the successful accomplishment of the missions of harbor defense. (See Axioms 1 to 6, inclusive).

How then can the harbor defense commander be said to have an independent mission? He may be said to have a special, primary, or

particular mission, but not an independent mission, for he has no independent command. His command and his mission are no more independent than that of the artillery brigade commander in an infantry division. The artillery brigade commander may be said to have the special mission of disposing and firing his guns to accomplish the result desired by the division commander, but he has no independent mission.

In compliance with Axiom 9 the division commander will tell the artillery brigade commander *what* he is to accomplish with the artillery, but not *how* to do it. Similarly, a subsector commander will direct a harbor defense commander under his command and will remove the latter if he fails to produce satisfactory results.

In both cases there is an infantry-artillery team, mutually dependent, under one commander, and properly so. It is perfectly obvious that a division is a tactical team, but it is not so evident to everyone that the forces of a subsector comprise a similar tactical team. I will endeavor to make it evident in what follows:

Quoting the Chief of Coast Artillery again: "It is also to be noted that the coast defense commander (harbor defense commander) is particularly dependent upon the sector or subsector commander's dispositions for protection of the rear and flanks of the coast defense command against raids." Exactly so, it may further be stated that the close defense of the beach by infantry and machine guns on the very *front* of a harbor defense is also vitally important, for once hostile infantry or marines effect a penetration anywhere within a harbor defense the artillery thereof is helpless unless supported by infantry. Witness the concrete case of the capture of Fort Randolph in the Panama maneuvers of this year by a force of 1600 marines landed in the very face of the fort. The artillery personnel of Randolph not only failed to prevent the landing according to the umpire, but was unable to put up any effective defense after the landing. As to whether this force of marines could have landed under the conditions, there was the usual diversity of opinion between the opposing forces. But once landed, no one disputed that the marines had Fort Randolph at their mercy and that even if they could not have held it, the very least they would have accomplished would have been its destruction. How then could this fort have performed its function in the so-called independent role of the Coast Artillery of keeping the area within its guns clear of hostile vessels? In the light of the foregoing instance, is it not obvious that without infantry to support it any harbor defense would fail in its mission? The Coast Artillery personnel must efficiently man guns, mine defenses and searchlights and cannot do

all this and furnish its own close defense as well with any success. If you need help in your job, how can you call it an independent job? At Fort Randolph, the infantry portion of the tactical team was lacking and the defense failed.

Now look at the other side of the picture. Assume that we have a subsector extending from Cape Charles, Virginia, inclusive to the North Carolina line, and that in it we have the "Coast Defense Command of Cape Charles and Cape Henry" organized on standard lines with a proportion of railway and heavy tractor armament. We will call this the Chesapeake Strong Point. The remainder of the subsector is organized for beach defense on standard lines with infantry, machine guns, and 75-mm. artillery.

An enemy has attained command of the sea and by means of numerous plane carriers has local air superiority sufficient to warrant an attempt at landing in force supported by naval forces. It becomes apparent that the enemy is going to make this attempt south of Virginia Beach out of effective range of the fixed armament of the Strong Point and of the mobile armament (railway and tractor guns) as at present emplaced within the Strong Point.

Supposing that the subsector commander fears to call on the Strong Point commander for as much of this mobile armament as he deems necessary to support his beach defenses for fear of interfering with the "independent" mission of the Strong Point. What happens? The enemy transports stand in close under support of his naval artillery which, at practically pointblank range for it, neutralizes or destroys the 75's and machine guns and a landing of a large hostile force is effected. As a result the Cape Henry portion of the Strong Point, taken in rear and flank, falls an easy prey. Cape Henry is the major part of the Strong Point and Cape Charles alone cannot deny the entrance to Chesapeake Bay. Again has the Coast Artillery failed in its "independent" mission, this time because its powers have not been properly brought to play as a part of the infantry-artillery tactical team of the subsector. Also the subsector commander has failed because he has not employed his team properly.

The fault lies with the basic War Department Training Regulations No. 10-5, which states that: "This branch (the Coast Artillery) has the independent role of keeping the area within reach of its guns clear of hostile vessels, and of preventing a run-by. When manning the heavy cannon of coast and land fortifications it will constitute a point of support for the associated combat branches."

*NOTE: Since writing this article the author has been informed that *hypothetical* infantry was sent to Fort Randolph for its close defense, which fact seems to have been overlooked by the senior umpire.

The author believes that the first sentence is misleading in that it would induce one to think by use of the word "independent" that the Coast Artillery can perform the role mentioned independently or in other words without support which the author submits he has demonstrated to be impossible. Also the reader is reminded that the Chief of Coast Artillery has stated that "the coast defense commander is particularly *dependent* upon the sector or subsector commander's dispositions for protection of the rear and flanks of the coast defense command, etc." The second sentence quoted from the basic training regulations is at fault in that it is too vague and indefinite by itself.

It is suggested that the aforesaid training regulations be amended to read as follows:

In harbor defense, this branch, supported by the associated combat branches, has the mission of keeping the area within reach of its guns clear of hostile vessels and preventing a run-by. In beach defense, it is specifically charged with the support of the associated combat branches, particularly the infantry, in denying hostile landings. In land warfare, it will function in the same general manner as prescribed for the artillery with forces in the field. It has no independent role.

By abolishing the word "independent" it is not intended to convey that a subsector commander would attempt to take direct command of a harbor defense or tell the harbor defense commander *how* to run his job. He would be governed by basic Axioms Nos. 8 and 9; and to perform his own job properly must of course comply with Axiom No. 7.

There is another phase of the question of command in coast defense. Army Regulation 90-30 prescribes as follows:

2. General duties of the Coast Artillery District Commander.

a. The Coast Artillery District Commander will command all Coast Artillery troops stationed within the territorial limits of his district, including the Coast Artillery of the Organized Reserves and of the National Guard, when the latter is called into the service of the United States.

b. He is responsible, under the Department or Corps Area Commander, for the discipline, instruction, training, and tactical employment of all elements of his command. He is also charged, under the Department or Corps Area Com-

mander, with supervision of the training and instruction of all Coast Artillery units of the National Guard within the territorial limits of his district, when not in the service of the United States.

The above regulation seems to throw a pretty effective monkey wrench into the machinery of command and organization we have been discussing in the previous pages. It is obviously impossible for the subsector commander and the Coast Artillery district commander to command simultaneously and be responsible for the tactical employment of the same unit of Coast Artillery troops. It would violate Axiom No. 6.

How shall this anomalous condition be corrected? The Chief of Coast Artillery has discussed the situation and proposed the remedy very clearly and succinctly in the following:

"With the exception of one phase of the question this regulation (A. R. 90-30) defines the status and prescribes the duties and responsibilities which, in my opinion, should pertain to the Coast Artillery District Commander, and I am convinced, after many years of experience by the Coast Artillery Corps, that the status of a commander now given him results in a supervision of the technical training of Coast Artillery troops of all three categories of the army, and a coordination of the various Coast Artillery activities in the territorial commands within which such troops are stationed, far superior to that which would result, if this position were to be abolished and the former policy of detailing a Coast Artillery Corps officer as an adviser in Coast Artillery matters on the staff of the territorial commander were resumed.

"The phase of this question above referred to as an exception, however, is one that should be considered and action taken to eliminate any possibility of confusion in time of war or upon mobilization.

"The duties and responsibilities of the Coast Artillery District Commander, as set forth in Army Regulations 90-30, will be in conflict with the well established principles of command in case of mobilization, and when defense sectors and subsectors are established and their commanders assigned, such commanders should, within the territorial limits of their sectors or subsectors, command all the troops assigned for coast defense purposes, including the harbor defense elements. This being the case, the command functions of the Coast Artillery District Commander over such harbor defense troops should cease as soon as these troops become a part of an established sector or subsector."

The Chief of Coast Artillery continues in substance as follows:

"For the reasons above set forth, it is my opinion that the Coast Artillery District Commander should be the immediate commander of all Coast Artillery troops in his district up to what may be termed the "readiness period" when frontier commands, sectors, and subsectors come into active existence and begin to function. When this period begins, the functions of the Coast Artillery District Commander have to do with the Coast Artillery activities in the District which pertain to the Zone of the Interior."

However, when the readiness period begins and throughout the period of hostilities as well, there will be certain important duties which should be the concern of a trained Coast Artillery officer of appropriate rank and experience, such as the building up of the peace time Coast Artillery garrisons to war strength, and the necessary reinforcement, under certain conditions, of one front by the transfer of personnel and materiel from another. This Coast Artillery officer will not exercise command in attending to these functions, but will act as the Coast Artillery adviser and staff officer of the frontier, sector, or subsector commander as the case may be; for all three of these commanders will need such a staff officer. The command functions necessary to the performance of these duties will of course be exercised actually by the frontier, sector, and subsector commanders. Thus the upper links of the chain of command will be preserved untangled and unbroken except for one more question which must be cleared up, namely, the status of a Corps Area Commander.

The latest War Department Plans divide the continental United States, as previously stated, into tactical and territorial areas called Frontier Commands. These will constitute initially the probable theaters of operations. On the sea frontier these commands conform generally to the present Corps Areas. These War Department plans prescribe that when hostilities threaten and the United States assumes what is known as the "National Position in Readiness," certain Corps Area Commanders will assume active command of these Frontier Commands. For instance, the Commanding General of the 9th Corps Area is designated to command the Western Frontier, which is nearly identical territorially with the 9th Corps Area. In time of peace he is charged as an individual and without prejudice to his duties as Corps Area Commander with the preparation of such detailed strategic and tactical plans and studies as may be directed by G. H. Q. He is authorized to utilize the services of any or all officers on duty at his headquarters who are deemed qualified and available for the work in hand.

However, the present Corps Areas are *not* based upon tactical considerations, but upon available man-power, and their primary function is the organization, training and mobilization of troops. War Department plans state that "the Corps Area Commander as such is the principal agent of the War Department in the Zone of the Interior and his duties in connection with mobilization are stated in Mobilization Regulations."

We thus see that certain Corps Area Commanders have dual functions and must use the officers under them in performing these functions. To summarize, broadly these functions are divided as follows:

As Corps Area Commander during peace, a designated general officer deals with the plans for the organization, training and mobilization of troops in his Corps Area in accordance with the Mobilization Regulations.

As Corps Area Commander during war he is charged with putting these plans into effect. Also as Corps Area Commander during war he is charged with the supply of all organizations (assigned to Frontier Commands and General Reserves) which are mobilized or concentrated in his Corps Area until a Communications Zone is established and in operation.

As a Frontier Commander during peace this same general officer is charged with the preparation of detailed strategic and tactical plans for the defense of his Frontier Command, and uses the Corps Area staff in such preparation.

In war time he actually takes command of the Frontier Command and puts these strategic and tactical plans into execution.

In peace time this one individual and his staff can perform these dual functions satisfactorily; but what of war time? In war both of these jobs are man-sized affairs and obviously cannot be handled by the same man and one staff efficiently. The War Department plans are silent on this subject, but it is obvious that when the "National Position in Readiness" is assumed, the following is what should logically occur:

General A, who has been in command of a Corps Area, will immediately assume active command of a Frontier Command and put into execution the strategic and tactical plans for its defense. As a nucleus for his staff he will take with him certain of his Corps Area staff who have been engaged primarily on these tactical plans and leave behind certain of that staff who have been working on mobilization plans to form the nucleus of the new Corps Area staff. Simultaneously, he will relinquish all duties as Corps Area Commander and be succeeded as such by General B, who preferably

should of course be an officer who is thoroughly familiar with the mobilization plan for that Corps Area.

General B, as the War Department principal agent in the Zone of the Interior, would then in accordance with the War Department plans be charged with the exploitation and development of the resources in men and material within the Corps Area or to be concentrated therein for military purposes; and with the supply of the means required by General A, the Frontier Commander, at such times, in such quantities, at such places and in such manner and form as will assure General A the freedom of action necessary for the accomplishment of his tactical mission.

It now seems more obvious that the Office of Coast Artillery District Commander should become (along with that of Corps Area Commander) a part of the Zone of the Interior when hostilities threaten, and while the actual incumbent might and probably would go with the Frontier Commander as Coast Artillery adviser and a member of his staff, the office of District Commander would thereby be vacated and a new District Commander would be appointed.

The tactical chain of command has now been untangled from G. H. Q., through the frontier, sector, and subsector commanders down to the harbor defense commander.

Now within a harbor defense, the commander thereof in accordance with T. R. 435-300, officially approved by the War Department, "coordinates and directs all military operations within his command including seaward, landward, and antiaircraft defense." He will have under him a commander of the Artillery of the strong point charged with purely artillery missions, an infantry commander charged with infantry missions and so on. However, there will be no independent artillery plan nor infantry plan, but a combined tactical plan for the use of *all arms* as a team. The strong point commander is responsible to the subsector commander under whose jurisdiction he falls, for the successful accomplishment of the team mission of the combined tactical force garrisoning the strong point, and will in time hold his immediate subordinates responsible for the carrying out of their assigned missions. In other words, he commands all arms assigned or attached to the harbor defense, including any infantry, machine guns, and 75's assigned thereto for close defense.

Consider now the case of the heavy tractor, railway, and mobile antiaircraft artillery so necessary to render beach defense effective. Ideally speaking, War Plans should provide an ample amount of these weapons to be made promptly available within any threatened subsector both for harbor defense and beach defense. Practically,

however, owing to the limited amount of materiel or trained personnel or both now in existence, the procedure will probably be to assign this mobile armament to the harbor defenses, and the subsector commander will have to exercise his discretion (aided by advice of the Coast Artillery officer on his staff) in withdrawing any of it from a harbor strong point for support of beach defense. When, however, such mobile armament is withdrawn from a harbor strong point, the strong point commander should cease to command or control it, and said mobile weapons should be placed under the command of a Coast Artillery groupment commander whose immediate superior should be the subsector commander. Upon return of any or all of these mobile units to a strong point they should of course at once revert to the command of the strong point commander.

It now remains to briefly discuss the Air Service in Coast Defense.

Each Frontier Commander should have under his direct control a strong air force independent of all subordinate commanders in the chain of command. This force should be a complete organization comprising all branches of aviation and capable of rapid concentration at any threatened point within the Frontier Command with the offensive mission of attacking all hostile forces within radius, naval, air, or ground.

In addition to this separate force each sector, subsector and harbor defense should have air service attached consisting chiefly of observation units.

Such an observation unit attached to a harbor defense should of course, in compliance with Training Regulations 435-300, be under command of the harbor defense commander and perform the functions of security and information, reconnaissance for artillery targets, and adjustment of artillery fire.

Included with this article is a diagrammatic representation of the Tactical Chain of Command in Coast Defense which in connection with the foregoing article eliminates any faulty or double chains and it is believed will form the basis of a sound workable scheme for the proper tactical employment of our military forces (as distinguished from naval) in Coast Defense.

The Evolution of Field Orders

By MAJOR C. H. CORLETT, *Infantry*

HISTORIANS from ancient times have given us accounts of campaigns and battles in sufficient detail to derive tactical and strategical lessons of great value from which principles can be deduced that apply today.

The outstanding fact of the historical examples is the strong character of the successful commander.

Where the commander of good judgment has dominated the situation and has coherently impressed his will on his subordinates, the outcome has usually been favorable, regardless of methods.

However, the older commanders of historical fame commanded relatively small forces and the weapons employed were simple; verbal orders appear to have been the rule on terrain where the commander himself could point out the plan of maneuver and objectives and by personal contact instill enthusiasm and loyalty in his force.

As armies became larger it became physically impossible for the commander to accomplish this task, so personal assistants in the way of staff came into being who carried orders verbally or written to the appropriate commanders. The form and general contents varied of course according to the personal equation of the commander, and errors of omission were frequent as well as errors in transmission. To employ written orders requires a considerable degree of education for both commander and subordinates, and the lack of maps made a clear definition of terrain very difficult. The first development along this line was the letter of instruction or written directive. These letters vary greatly in form and contents according to the author and situation. Some were very general in character and were designed to cover the activities of a considerable period. Others go into great detail and attempt to anticipate and prescribe formulae for every possible course the enemy may take. In practically every instance, however, the germ of our present field order is found. The letter of instruction or directive has been and always will be a form of correspondence and from the very nature of the instrument should have no prescribed form except that dictated by logic and rhetoric. It will always be a necessity, but its principal use is to give instruction of a general nature to cover a more or less protracted period of operations.

General Grant's directives to the various commanders of the Union army in 1865, is a good example of this conception, as also are the many letters of instruction of Napoleon to distant subordinates. If we then leave the letter of instruction as an expression of the will of the commander in his own way conforming to the situation that presents itself, we can pass on to the more important development of the field order, which is designed to directly control and coordinate troops in battle in accordance with the tactical necessities of the case.

Troops cannot be blindly dispatched to battle with any hope of success. Certain information and directions to control their future actions are essential. They should know what they must overcome in the way of an enemy, in other words, their difficulties, any assistance they can expect from parallel or supporting troops, how the difficulties are to be overcome, the part that each element is to take in overcoming the difficulties, the manner in which the maintenance or upkeep is to be applied and finally the location of the coordinating or directing agency. With this logical statement of the necessities for troops in battle, in mind, it is desired to examine a few of the early orders to demonstrate that the same elements have always governed to a greater or less extent and that the recognition of these elements have tended toward our present form of orders.

One of the oldest written orders yet found, and furnished through the courtesy of Colonel Oliver L. Spaulding, is that of the French Duc d' Enghien, later known as the "Great Condé," for the battle of Rocroi in 1643, against the Spanish, of which a translation is given below with a rough sketch of the maneuver directed and accomplished resulting in a quick defeat of the Spanish forces.

TRANSLATION OF FIELD ORDER FOR THE BATTLE OF ROCROI, 1643

Translated by CAPT. E. M. BENITEZ, C. A. C.-DOL.

THE RIGHT FLANK:

"Picardy will establish the right flank. Marine will come up on its left, on the same line, at 170 paces interval. Persons will follow in the same manner and come up to the left of Marine at above interval. The first battalion of Molondin will come up on the same line to the left of Persons at 170 paces interval. The second battalion of Molondin will follow the first battalion, take position on same line at the left of the second and at interval given above. Vervin and La Pree will follow, establishing the second line, 300 paces to the rear of the first, and will cover the space between Picardy and Marine. Vidame will follow Vervin, coming up on its left at an interval of 170 paces. The first battalion of Wateville will follow Vidame, and form in the same manner to the left at 170 paces interval. The Ecossois will form line of battle to the left of Wateville.

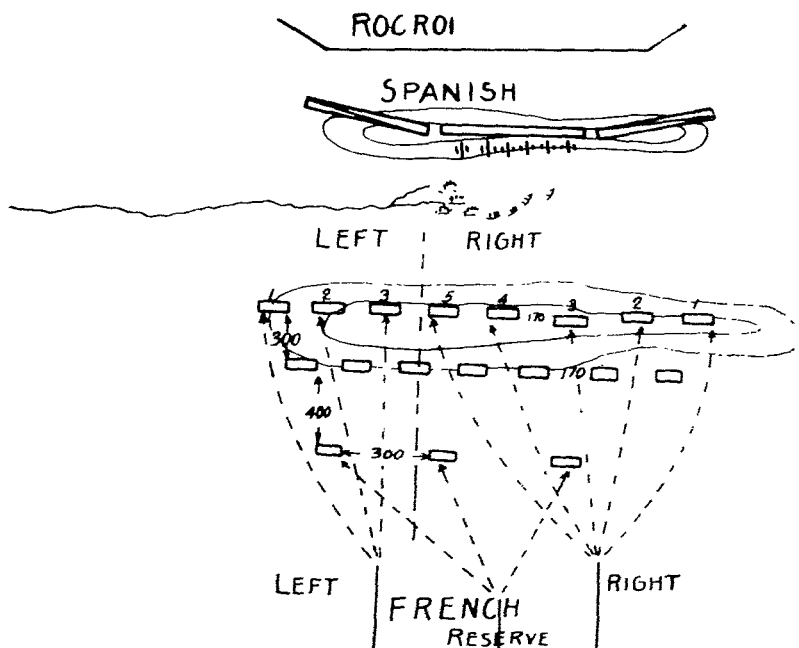
THE LEFT FLANK:

"Piedmont will move on to the left flank. Rambures will follow it, coming up to right on the same line at 170 paces interval. Bourdonne and Viscaras will follow Rambures, coming up to its right at 170 paces interval.

"Bussy and Guiche will establish the second line, 300 paces to the rear of the first, and will cover the interval between Piedmont and Rambures. Breze and Langeron will come up to the right of Bussy and Guiche at 170 paces interval. Rolle will follow Breze, forming to the right at 170 paces interval.

THE RESERVE:

"Harcourt, Aubeterre and Gesvres will march at the head of the Reserve and remain 400 paces to the rear of the second line, covering the interval between Vidame and the first battalion of Wateville. The second battalion of Wateville will follow and come up on their left at 300 paces interval, to support the first battalion. The Royals will follow the second battalion of Wateville, forming on its left at 300 paces interval."



This order contains only what we commonly designate as paragraph 3 of the field order. The account accompanying the order shows that it was based on a very thorough cavalry reconnaissance and that the appropriate commanders understood the situation regarding the enemy and their own troops. It is probable the junior commanders knew little. No mention is made of administrative details which may have been given verbally or due to the relatively small operation, may have been considered unnecessary. The commander led the attack of the right flank which was the main attack, and the post of honor and his customary post. The interesting fact in connection with the order is that it directed, in considerable detail, a rather complicated drill ground maneuver in the face of an enemy in a simple coherent way, which accomplished with great success in the face of an active enemy the result desired.

Going now to our own American Revolution, we find written orders more prevalent, and can find more clearly an attempt to express every necessity of the case.

An order of General Washington's preliminary to a march has been selected. As a preface, this march was for a special purpose. It was in the nature of a parade through Philadelphia to counteract Tory influence in that city shortly before the Battle of Brandywine. It is therefore not illustrative of a march in campaign, but more in the nature of a parade.

The order follows:

Headquarters, Stanton, Near Germantown,
August 23, 1777

Major-General tomorrow	Lord Stirling
Brigadier-General tomorrow	Scott
Field Officers tomorrow	Col. Grayson, Lieut. Col. Genny
Brigade-Major tomorrow	Johnson

WARNING
ORDER

No officer or soldier is to leave the encampment this evening without leave in writing from the Major or Brigadier under whom he acts, and they are desired not to give such leave unless there is apparent cause for it. The Army is to move precisely at 4 o'clock in the morning, if it should not rain.

MISSION OR
PAR. 2

The division commanded by General Wayne is to join its proper place in the line, between Lord Stirling's and General Stevens' divisions, and it is strongly and earnestly enjoined upon the commanding officers of corps, to make all their men who are able to bear arms, except the necessary guards, march in the ranks, for it is so great a reflection when all orders are disobeyed, and to see such a number of street-rollers (for they cannot be called guards) with the wagons, that it is really shocking.

The Army is to march in one column through the city of Philadelphia, going in at and marching down Front street to Chestnut, and up Chestnut to the Common.

A small halt is to be made about a mile this side of the city until the rear is clear up and the line in proper order.

DISTRIBUTION OF TROOPS
OR PAR. 3

The Divisions will march as follows:

Greene's, Stevens', Lincoln's, and Lord Stirling's. The horse to be divided upon the two wings. Bland's and Baylor's regiments on the right, and Sheldon's and Moylan's on the left.

The following order of march is to be observed, viz.:

First, a subaltern and twelve light-horse.

Two hundred yards in rear, a complete troop.

Two hundred yards in the rear of the troops, the residue of Bland's and Baylor's regiments.

One hundred yards in the rear of these, a company of Pioneers with their axes, etc., in proper order.

One hundred yards in the rear of the Pioneers, a regiment from General Muhlenberg's Brigade, and close in the rear of that regiment all General Muhlenberg's Field Artillery.

This Brigade followed by Weedon's, Woolford's, and Scott's in order, with all their Field Artillery in their respective fronts.

DISTRIBUTION OF TROOPS
OR PAR. 3

Park of Artillery, and the Artificers belonging thereto, in the centre.
 Lincoln's and Lord Stirling's divisions following, with all their Brigade Artillery in the rear of their respective Brigades.
 A regiment from Lord Stirling's Brigade for a rear guard, and to be 150 yards from General Maxwell's Brigade.
 Sheldon's and Moylan's horse, 150 yards in the rear of this regiment.
 One troop, 150 yards in the rear of this regiment of horse.

SUB PAR.

The whole line is to march by subdivisions at half-distance, the ranks six paces asunder, which is to be exactly observed in passing through the city, and great attention given by the officers to see that their men carry their arms well, and are made to appear as decent as circumstances will admit.

It is expected that every officer without exception will keep his post in passing through the city, and under no pretence whatever leave it; and if any soldier shall dare to leave his ranks he shall receive thirty-nine lashes at the first halting-place afterwards. The officers will be particularly careful of the men, not only in their own divisions, but in others also, if they should see any attempt of the kind. They are also to prevent the people from pressing on the troops.

There is to be no greater space between the divisions, brigades and regiments than is taken up by Artillery, and is just sufficient to distinguish them.

ADMINISTRATIVE
ORDER OR PAR. 4

That the line of march through the city may be as little encumbered as possible, only one ammunition wagon is to attend the field pieces of each brigade and every artillery park. All the rest of the baggage wagons and spare horses are to file off to the right, to avoid the city entirely, and move on to the bridge at the middle ferry and then halt, but not so far as to impede the march of the troops by preventing their passing them.

Not a woman belonging to the Army is to be seen with the troops on their march through the city.

A. O. OR PAR. 4

The Wagonmaster-General with all his assistants, together with the Division, Brigade and Regimental Quartermasters, are to attend the wagons, and assist the field-officers appointed to that duty in preventing any men who are allotted to the wagons from slipping into the city. As the baggage will be but a little time separated from the column, a very few men will be sufficient to guard it, and the General wishes to have as many of them appear in the ranks in the line of march as are able.

The baggage and spare artillery wagons of each brigade, together with the wagons of the artillery park, are to move with the same orders that the brigades, etc., do in the line, that they may more easily unite again when we have passed the city.

The soldiers will go early to rest this evening, as the General expects the whole line will be on their march at the hour appointed. That this may be the case, each Brigadier is to appoint patrols to take up all the stragglers from camp, and all others of the Army who do not obey this order.

The Director of the Hospital will order when the sick are to be sent.

The drums and fifes of each brigade are to be collected in the centre of it, and a tune for the quick-step played, but with such moderation that the men may step to it with ease, and without dancing along, or totally disregarding the music, as has been too often the case.

The men are to be excused from carrying their camp-kettles tomorrow.

GEORGE WASHINGTON.

Here it is noted that the first two sentences corresponds to our present conception of a warning order. The first sentence of the second paragraph states what is to be done or the mission, followed by a statement of how it is to be done, closely resembling the paragraph 3 of our present march order. After this, we find several sentences that might very properly fall under subparagraph X of paragraph 3 or be omitted entirely with well trained troops.

The Wagonmaster and Quartermaster are given their instructions in logical sequence concerning baggage, supply, and stragglers, with responsibility placed for the sick, an embryo administrative order or paragraph 4 of the present field order.

The place of the commander was understood by all to be at the head of the column, so a paragraph 5 was unnecessary. The march accomplished in compliance with this order was a success and served the purpose for which it was intended. It demonstrates clearly that without any model or guide the mind of General Washington arranged the various details in a logical order corresponding to our present type of order.

It is next desired to examine one of the orders prepared by Napoleon's Chief of Staff, Marshal Berthier, for the distribution of the troops at the Battle of Jena, which follows:

GENERAL ORDERS

DISPOSITIONS FOR ORDER OF BATTLE

CN-11004
(WD FILES)

Bivouac at Jena, 14 October, 1806.

Marshal Augereau will command the left. He will place his 1st Division in column on the Weimar road, on a line so that General Gazan may place his Artillery on the plateau. He will detail such forces as are necessary on the plateau on the left, on a line with the head of his column. He will have skirmishers along the entire hostile line at the different exits of the mountains. When General Gazan moves forward, he will advance on the plateau with his entire Army Corps and will then march according to circumstances to attack the left of the Army.

Marshal Lannes will have, at daybreak, all his Artillery in his intervals, and in the order of battle in which he has passed the night.

The Artillery of the Imperial Guard will be placed on the high ground and the guard will be in rear of the plateau, drawn up in five lines, the first line consisting of chasseurs on top of the plateau.

The village which is on our right will be bombarded by all the Artillery of General Suchet and immediately attacked and captured.

The Emperor will give the signal; everything is to be ready at daybreak.

Marshal Ney will be posted, at daybreak, at the edge of the plateau, to move up on it and advance on the right of Marshal Lannes, at the moment when the village is captured, by which space for deployment will be secured.

Marshal Soult will advance by the road which has been reconnoitered on the right and will constantly keep connected to support the retreat of the Army.

The order of battle in general will be, for the Marshals to form in two lines exclusive of the Light Infantry; the distance between the two lines will be 100 fathoms.

The Light Cavalry of each Army Corps will be at the disposition of each General, to be used according to circumstances.

The Heavy Cavalry, as soon as it arrives, will be placed on the plateau in rear of the Guard, available as circumstances may require. What is today important, is to deploy in the plain; dispositions will then rapidly be made according to the maneuvers and forces of the enemy, in order to force him from the positions which he occupies and which are necessary for the deployment.

By Command of the Emperor.

MARSHAL BERTHIER.

This order deals primarily with the deployment of troops for a battle the following day, and is silent on any information of the enemy or administrative details. The last sentence gives the mission in a very general way and a statement to the effect that "The Emperor will give the Signal," shows that there was a vague realization that our present paragraph 5 should be included.

The instructions given the various elements of the command are clear and as a paragraph 3 for the purpose, it would answer very well according to our present standards. As every one knows, it was successfully carried out, resulting in a notable victory.

Although the Americans have been given little credit for the development of the field order in its final form, the order published by General Scott for the Battle of Cerro Gordo in the Mexican War in 1847, might very properly have been the forebearer of our present system had its worth been recognized and accepted.

GENERAL ORDERS NO. 111

Headquarters of the Army, Plan Del Rio, April 17, 1847.

- | | |
|--------------|---|
| PAR. 2 | { The enemy's whole line of intrenchments and batteries will be attacked in front, and at the same time turned, early in the day tomorrow—probably before 10 o'clock A. M. |
| PAR. 1 AND 3 | { The Second (Twiggs') Division of Regulars is already advanced within easy turning distance towards the enemy's left. That division has instructions to move forward before daylight tomorrow, and take up a position across the national road in the enemy's rear, so as to cut off a retreat towards Xalapa. It may be reinforced today, if unexpectedly attacked in force, by regiments—one or two taken from Shields' Brigade of Volunteers. If not, the two volunteer regiments will march for that purpose at daylight tomorrow morning, under Brigadier-General Shields, who will report to Brigadier-General Twiggs, on getting up with him, or the General-in-Chief, if he be in advance. |

PAR. 3

The remaining regiment of that Volunteer Brigade will receive instructions in the course of this day.

The first Division of Regulars (Worth's) will follow the movement against the enemy's left at sunrise tomorrow morning.

As already arranged, Brigadier-General Pillow's brigade will march at six o'clock tomorrow morning along the route he has carefully reconnoitred, and stand ready as soon as he hears the report of arms on our right, or sooner if circumstances should favor him, to pierce the enemy's line of batteries at such point—the nearer the river the better—as he may select. Once in the rear of that line, he will turn to the right or left, or both, and attack the batteries in reverse; or, if abandoned, he will pursue the enemy with vigor until further orders.

Wall's field battery and the Cavalry will be held in reserve on the national road, a little out of view and range of the enemy's batteries. They will take up that position at nine o'clock in the morning.

The enemy's batteries being carried or abandoned, all our divisions and corps will pursue with vigor.

This pursuit may be continued many miles, until stopped by darkness or fortified positions towards Xalapa. Consequently, the body of the Army will not return to this encampment, but be followed tomorrow afternoon, or early the next morning, by the baggage trains of the several corps. For this purpose, the feebler officers and men of each corps will be left to guard its camp and effects, and to load up the latter in the wagons of the corps. A commander of the present encampment will be designated in the course of this day.

PAR. 4

As soon as it shall be known that the enemy's works have been carried, or that the general pursuit has been commenced, one wagon for each regiment and one for the cavalry will follow the movement, to receive, under the directions of medical officers, the wounded and disabled, who will be brought back to this place for treatment in General Hospital.

The Surgeon-General will organize this important service and designate that hospital, as well as the medical officers to be left at it.

Every man who marches out to attack or pursue the enemy, will take the usual allowance of ammunition, and subsistence for at least two days.

By Command of Major-General Scott.

H. L. SCOTT, A. A. A. GENERAL.

His first paragraph very clearly states the mission. This is followed by detailed instructions to the various elements of his command and finally the necessary administrative details are given.

Unfortunately the orders of General McDowell, operating under General Scott early in the Civil War, were not as coherent. They were long and very much involved with many repetitions.

The order for the advance on to the first Battle of Bull Run is quoted:

REPORTS OF BRIG. GEN. IRVIN McDOWELL, COMMANDING U. S. FORCES, OF OPERATIONS FROM JULY 16 TO 20, 1861, WITH ORDERS FOR MOVEMENTS AND A RETURN OF TROOPS.

GENERAL ORDERS }
No. 17 }

Hdqrs. Dept. N. E. Virginia,
Arlington, July 16, 1861.

The troops will march to the front this afternoon in the following order:

1. The brigades of the First Division (Tyler's) will leave their camps in light marching order, and go as far as Vienna, the Fourth Brigade (Richardson's) taking the road across the chain bridge, by way of Langley's, Louisville, and old court-house; the others by the Georgetown turnpike and Leesburg stone roads. The order of march of the several brigades to be arranged by the Division Commander.

2. The Second Division (Hunter's) will leave their camps in light marching order, and go on the Columbia turnpike as far as the Little River turnpike, but not to cross it, the Second Brigade (Burnside's) leading.

3. The Third Division (Heintzelman's) will leave their camps in light marching order, and go on the old Fairfax Court-House road, south of the Orange and Alexandria railroad, as far as the Accotink, or the Pohick, if he finds it convenient; the brigades to march in the order the Division Commander may direct.

4. The Fifth Division (Miles') will proceed in light marching order, by the Little River turnpike as far as Annandale, or to the point where the road leads to the left to go into the old Braddock road (so-called), which runs between the Little River turnpike and the Orange and Alexandria railroad.

5. The brigades of the several divisions will be put in march in time to reach their respective destinations by dark.

6. The Reserve will be held in readiness to march at the shortest notice, and will, on and after the 17th instant, keep constantly a supply of cooked rations on hand for two days.

7. Brigadier-General Runyon, commanding the Reserve, will have command of all the troops not on the march to the front, including those in the fortifications and camps. He will, tomorrow, send two regiments up the Orange and Alexandria railroad to aid the railroad managers in rebuilding it in the shortest possible time, the commanding officers to conform to the plans of the principal managers.

8. Brigadier-General Runyon will guard the Loudoun and Hampshire railroad as far as the present camps of the Ohio Volunteers, and the Orange and Alexandria railroad as far as it is or may be repaired.

9. The regiment now in Fort Corcoran, the Twenty-eighth New York; the Twenty-fifth New York, at Roach's; the Twenty-first New York, at Fort Runyon, and the Seventeenth New York, at Fort Ellsworth, will not be removed from their present stations except in an emergency.

II. On the morning of the 17th the troops will resume their march after daylight in time to reach Fairfax Court-House (the Third Division, Sangster's) by 8 o'clock A. M.

1. Brigadier-General Tyler will direct his march so as to intercept the enemy's communication between Fairfax Court-House and Centreville, moving to the right or the left of Germantown, as he may find most practicable. On reaching the Centreville turnpike he will direct the march of his leading brigade upon Centreville or Fairfax Court-House, as the indication of the enemy may require. The Second Brigade will move on the road in the direction not taken by the first. The rear brigades will be disposed of by the Division Commander as circumstances may require. Should he deem it best, a brigade may be sent on Fairfax Court-House direct from Flint Hill.

2. The Second Division (Hunter's) will (after the road shall be cleared of the Fifth Division) move on the direct road to Fairfax Court-House by the Little River turnpike.

3. The Fifth Division (Miles') will turn off from the Little River turnpike and gain the old Braddock Road, which it will follow to its intersection with the

road from Fairfax Court-House to Fairfax Station, where it will turn to the right and move on the Court-House.

4. The Third Division (Heintzelman's) will move by the best and shortest of the roads to the south of the railroad till he reaches the railroad at Sangster's. He will, according to the indications he may find, turn his second and third brigades to the right, to go to Fairfax Station or to the front to support the first brigade. He may find it necessary to guard the road coming up from Wolf Run Shoals and the one leading to Yates' Ford.

III. The enemy is represented to be in force at Centreville, Germantown, Fairfax Court-House and Fairfax Station, and at intermediate places, and on the road towards Wolf Run Shoals. He has been obstructing, as far as possible, the roads leading to Fairfax Court-House, and is believed on several of these to have thrown up breastworks and planted cannon. It is therefore probable the movements above ordered may lead to an engagement, and everything must be done with a view to this result.

The three following things will not be pardonable in any commander: 1st. To come upon a battery or breastwork without a knowledge of its position. 2d. To be surprised. 3d. To fall back. Advance guards, with vedettes well in front and flankers and vigilance, will guard against the first and second.

The columns are so strong and well provided that, though they may be for a time checked, they should not be overthrown. Each is provided with intrenching tools and axes, and if the country affords facilities for obstructing our march, it also gives equal facilities for sustaining ourselves in any position we obtain. A brigade should sustain itself as long as possible before asking for help from another. It can hardly be necessary to attack a battery in front; in most cases it may be turned. Commanders are enjoined to so conduct their march as to keep their men well closed up. This is of great importance. No man will be allowed to get into an ambulance or baggage wagon without written authority from the regimental surgeon or his superior. Guards will be placed over the ambulances and wagons to enforce this order.

Troops will march without their tents, and wagons will only be taken with them for ammunition, the medical department, and for intrenching tools. A small baggage train for each brigade, to take the camp-kettles, mess-pans, and mess-kits, and the smallest allowance of personal baggage of the officers and men, will follow the divisions the day after they march. This train will consist of from twelve to fifteen wagons.

A subsistence train will follow at a day's interval the First Division from Fort Corcoran and Vienna. A second subsistence train will follow the second division at a day's interval. A wagon for forage will be taken with each battery and squadron. A herd of beef cattle will be sent with each subsistence train. There is on many of our regiments nothing to distinguish them from those of the enemy, and great care must be taken to avoid firing into each other.

The national color must be kept continually displayed, and, if possible, small national colors should be placed on the cannon of the batteries.

Division commanders will see that the axmen and engineers at the head of the columns (and men of the ordnance guard) are well provided and in condition to work efficiently. When there are no ax-slings, the axes will be carried and the muskets will be slung.

Department headquarters will be with the Second Division, on the Little River turnpike. Division commanders will communicate with them by every opportunity.

By Command of Brigadier-General McDowell.

JAMES B. FRY, A. A. G.

A great deal of fault can be found with this order. The repetition, superfluous matter and poor arrangement is apparent to all according to our present standards. The second day's order is given with the first day, outlining the attack without any contact with the enemy. We find, however, scattered through the document

the necessary elements of a good order had the arrangement been proper and the superfluous matter eliminated. For instance, the first two sentences of paragraph III gives the information of the enemy. Information of supporting troops is given in paragraphs 7, 8, and 9. The mission is given in the first sentence of the order. Detailed instructions are given in paragraphs 1 to 5 inclusive. Administrative details and supply are treated under paragraph III and the location of the command post is given under the last subparagraph of the order.

Many types of orders were developed during our Civil War, but none of them were fixed, and depended on any logical sequence of the necessary elements. The letter of instructions and orders in that form seemed to be the most common form of written order. No particular advantage was taken of the experience obtained in many campaigns, although many coherent and forceful examples of orders in form of letters were issued by the various commanders.

To the elder von Moltke and to the German general staff must be given the credit of clarifying and simplifying directives and field orders.

A marked difference is observed in the orders issued by German commanders in the Franco-Prussian War and those issued by French commanders.

Many French orders were verbose, rambling and faulty, while the German orders are models of precision and conciseness.

As an example of the French method or lack of method, the instructions of General Chanzy, one of their best generals, is of interest. He states: "The enemy today attempted to force us from our position. He attacked in succession at Saint Baureut-des-Bois and in the direction of Poisly, Cravant and Villorcean. From information received from prisoners we learn that Prince Charles with his entire army was engaged, together with numerous artillery. Everywhere we have resisted with energy and good order and have remained in possession of the field after having inflicted heavy losses upon the enemy. All should be inspired by this new success and be filled with confidence thereby. We must keep our positions and continue to resist if the Germans make an attack tomorrow," and so on for four printed pages. Many sentences are practically meaningless as, "The cavalry shall be placed in such a way as to profit by occasions to fall upon the enemy." "Each division commander will point out precisely where his baggage will go in case of attack tomorrow." "All troops who were engaged today shall have an extra ration of brandy." These were scrambled with directions for rations, ammunition, appointment of doctors and reports required.

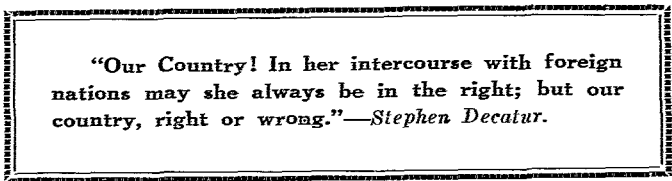
Our own orders in the Spanish-American War were very little if any better. During the campaign of Santiago de Cuba, General Shafter issued on June 20, 1898, General Order No. 18, governing the disembarkation of his army. After this, however, although over 15,000 troops were engaged in the battles of San Juan and El Caney, no written, and but a few verbal orders, were issued by any commander. During the latter Philippine campaign written orders were attempted, but the results were unsatisfactory, according to our present standards.

While most countries seemed to have lost ground in the application of the art of war, the Germans steadily progressed. Von Verdes' tactical studies contributed largely to this progress. About 1905, General Griepenkerl's letters on applied tactics made a profound impression. His work was translated by the English, French, Greeks, Japanese and in the same year General J. F. Bell and Major Eben Swift, the Commandant and Assistant Commandant of the Staff College at Leavenworth, obtained a translation which had a profound effect on the instruction of the American Army.

Major Swift wrote a book on orders based on Griepenkerl which was accepted as a guide by the War Department. This book specified practically the same order that we now employ.

Great volumes of orders used during the World War are now accessible. They are in various forms but practically all of them that are considered good follow the German school of thought.

While the basis of the field order remained the same, the administrative order, appendices and annexes came into being as a necessity. After the World War the General Staff and Service Schools have attempted to select and put in practice the best methods.



"Our Country! In her intercourse with foreign nations may she always be in the right; but our country, right or wrong."—Stephen Decatur.

The Development of a Military Policy

Reprinted from THE WORK OF THE WAR DEPARTMENT

PRIOR to the Revolutionary War governmental policies in America were determined by the mother country. Hence, although every community had to be ever ready to defend itself against local attack by Indians, and each colony developed a militia which at times was employed on campaigns for considerable periods, nevertheless the problem of national organization for common defense did not arise. The British Army was their bulwark against a common foe. The military establishment was organized and administered by edict of the King.

Friction with England forced the colonies to unite and organize for common protection. The problem of common defense suddenly became paramount. Yet there was no common assembly to consider it and no plans nor means for securing concerted action.

In 1774 the First Continental Congress, consisting of representatives from colonial assemblies, met in Philadelphia, drew up a declaration of rights and grievances to be sent to the King, and adjourned until the following year. No steps looking toward military action were taken, in the hope that armed conflict might be avoided.

When the Second Continental Congress convened the following year all hopes for conciliation were gone. The Battle of Lexington had been fought three weeks before. The immediate and pressing problem now was how to raise, equip, and maintain an army for the common defense. There were many difficulties to be overcome. The delegates had no authority to act for the colonies which they represented; each delegate was jealous of the power of the others; there was no executive head to Congress; there was no organization for setting up and carrying on a central government; and there was a deep-seated aversion on the part of the people toward standing armies, an aversion dating back to the struggle of the common people of England against the Stuart kings of the seventeenth century, when armies had been used to abuse the people, not to defend them. The English Puritans and the cavaliers of the colonies had always been stubborn in protesting that no army should be quartered upon them except by the consent of their own legislatures.

Notwithstanding these and many other difficulties, Congress was compelled to assume the functions of a civil government and to organize to carry on the war for defense. It appointed committees for war, but it refused to give them any power; it constantly changed the membership of the committees; and it jealously rendered their work ineffectual by passing frequent "resolves" which covered all the business of war.

Under such conditions Washington found it almost impossible to keep an army in the field. When he was made Commander-in-Chief of the Continental Army, it numbered about 17,000 men, the enlistment of every one of whom would expire before the end of the year. Most men preferred enlisting in the militia, where the term was short and the discipline was lax, to joining the Regular Continental regiments. Though he impressed upon the soldiers the serious consequences of leaving the Army before the new troops could be trained, they left him by hundreds the day the period of enlistment ended.

Bounties were offered to encourage enlistments and the amount of money offered was gradually increased. The time came when men who enlisted for short periods under this system were receiving more pay than the officers who were training them. Serious trouble with the officers followed. Desertions from the Army were frequent.

Washington repeatedly reminded Congress of his conviction that the campaigns failed because little dependence could be placed in the militia, because there was no definite military policy and because of the failure to furnish necessary supplies. In a letter to Congress he said:

The disadvantages attending the limited enlistment of troops are too apparent to those who are eyewitnesses of them, * * * but to gentlemen at a distance whose attention is engrossed by a thousand important objects, the case may be otherwise. * * * To bring men to be well acquainted with the duties of a soldier requires time. To bring them under proper discipline and subordination not only requires time, but it is a work of great difficulty; and in this Army, where there is so little distinction between the officers and soldiers, requires an uncommon degree of attention. To expect, then, the same service from raw and undisciplined recruits as from veteran soldiers is to expect what never did and perhaps never will happen. * * *

At another time he wrote:

Connecticut wants no Massachusetts men in her corps, Massachusetts thinks there is no necessity for a Rhode Islander to be introduced into hers, and New Hampshire says it is very hard that her valuable and experienced officers, who are willing to serve, should be discarded, because her own regiments under the establishment, cannot provide for them.

Congress failed to heed Washington's advice. It did increase the bounties offered, but the paper money issued was practically

worthless, and wholesale desertions followed. The soldiers were half starved and insufficiently clothed. Mutinies were numerous. In the midst of these troubles and successive defeats, Congress persisted in making plans to reduce the size of the Army, but the war did not end. Finally the period of enlistment was extended to "three years" or "during the war" at the discretion of the soldier, and Washington was given complete charge.

These experiences, together with the defeat of General Gates at Camden, brought forth the following expression from Washington in a letter to the President of Congress:

This event, however, adds itself to many others, to exemplify the necessity of an army, and the fatal consequences of depending on militia. Regular troops alone are equal to the exigencies of modern war, as well for defense as for offense; and whenever a substitute is attempted, it must prove illusory and ruinous. No militia will ever acquire the habits necessary to resist a regular force. * * * The firmness requisite for the real business of fighting is only to be attained by a constant course of discipline and service. * * * It is most earnestly to be wished, that the liberties of America may no longer be trusted, in any material degree, to so precarious a dependence.

At the conclusion of the war Congress decided to dispense with a standing army. It ordered the discharge of the Continental troops with the exception of about 80 soldiers, who were kept to guard public stores. Constant Indian troubles and civic disorders, however, compelled an increase in this number to make up a force of several hundred men.

In the meantime the war organization had undergone successive changes in the Continental Congress. When the committees for war failed, boards of war had been appointed; yet Congress itself continued to direct all military affairs, until these boards became as powerless and ineffective as the committees which preceded them. At the conclusion of the war, after a long dispute, Congress resolved to create a department of war whose chairman should be called the Secretary of War. Under the leadership of General Henry Knox, the second Secretary of War, the department became well organized. The new Department of War established under the Constitution of the United States was organized on a similar basis and the former Secretary retained. At its beginning, the Department of War included the functions which are now divided among the Departments of War, the Navy, and the Interior.

Although the Revolutionary War was over, the problem of adequate protection of the new nation was one of the gravest that presented themselves. In his first annual address to Congress, President Washington said:

Among the many interesting objects that will engage your attention, that of providing for the common defense will merit particular regard. To be prepared for war is one of the most effectual means of preserving peace.

In formulating a military policy under the new government, the prejudice of the people against a standing army again came to the surface. Even with the lessons of the past war fresh in their minds, the majority of the people believed that a large army would provoke war. A maxim arose: "A standing army is dangerous to liberty." There was no distinction in the public mind between the army proposed by Washington and the armies of the past, which had been the mercenaries of despots. Congress attempted to solve the problem by passing two statutes.

The first act, passed in 1790, laid the foundation for the volunteer system. It empowered the President to employ for a short term

not exceeding six months, * * * a corps not exceeding two thousand non-commissioned officers, privates, and musicians, with a suitable number of commissioned officers. And in case it shall appear probable to the President that the regiment * * * will not be completed in time to prosecute such military operations as exigencies may require, it shall be lawful for the President to make a substitute for the deficiency by raising such further number of levies or by calling into the service of the United States such a body of militia as shall be equal thereto.

The second act, passed in 1792, had for its purpose "more effectually to provide for the national defense, by establishing an uniform militia throughout the United States." It provided—

That each and every free, able-bodied white male citizen of the respective States, resident therein, who is or shall be of the age of eighteen years, and under the age of forty-five years, * * * shall, severally and respectively, be enrolled in the militia by the captain or commanding officer of the company, within whose bounds such citizen shall reside, and that within twelve months after the passing of this act. And it shall at all times hereafter, be the duty of every such captain or commanding officer of a company, to enroll every such citizen, as aforesaid, and also those who shall, from time to time, arrive at the age of eighteen years, or, being the age of eighteen years, and under the age of forty-five years, * * * shall come to reside within his bounds; and shall without delay, notify such citizen of the said enrollment, by a proper noncommissioned officer of the company, by whom such notice may be proved. That every citizen so enrolled and notified, shall, within six months thereafter, provide himself with a good musket or firelock, a sufficient bayonet and belt, two spare flints and a knapsack, a pouch, with a box therein to contain not less than twenty-four cartridges, suited to the bore of his musket or firelock, each cartridge to contain a proper quantity of powder and ball; or, with a good rifle, knapsack, shot pouch, and powder-horn, twenty balls suited to the bore of his rifle, and a quarter of a pound of powder; and shall appear, so armed, accoutered, and provided, when called out to exercise or into service; except, that when

called out on company days' exercise only, he may appear without a knapsack. That the commissioned officers shall, severally, be armed with a sword or hanger and spontoon; and that from and after five years from the passing of this act all muskets for arming the militia, as herein required, shall be of bores sufficient for balls of the eighteenth part of a pound, and every citizen so enrolled and providing himself with the arms, ammunition, and accouterments required as aforesaid, shall hold the same exempted from all suits, distress, executions, or sales for debt, or for the payment of taxes.

This act was significant by its recognition of common defense as a duty of citizenship and by definitely placing the responsibility on the individual citizen. Though with modifications it remained a law until the national defense act of 1916, its terms were never fully carried out. It was the general belief when this act was passed that the militia of the various States could be relied upon for protection in case of an emergency. The War of 1812, however, demonstrated again the weakness of the militia as an effective weapon for the defense of the nation.

When the second war with England became imminent, the Secretary of War called, as authorized by law, upon the governors of the states for troops. In answer to his second letter to the Governor of Massachusetts, urging immediate compliance with his request because of "the danger of invasion, which increases," Governor Strong replied—

the people of this State appear to be under no apprehension of an invasion; several towns, indeed, on the seacoast, soon after the declaration of war, applied to the Governor and Council for arms and ammunition, * * * and in some instances, they were supplied accordingly. But they expressed no desire that any part of the militia should be called out for their defense, and in some cases we were assured that such a measure would be disagreeable to them.

Other states replied in like vein. The Governor of Vermont, in a proclamation ordering the militia to return to their homes, declared that "in his opinion, the military strength and resources of the state must be reserved for its own defense and protection exclusively."

Some of the militia refused to enter Canada, asserting that the war was one of defense and not of offense, and that the militia could not be used to wage an offensive war. Some of the states made it an act of disobedience for their citizens to serve the nation. By such acts as these the Federal Government was embarrassed in its attempts to gain the cooperation of the militia for national defense. Congress offered large bounties to volunteers, but this did little more than stimulate the crime of desertion.

The series of humiliating defeats which attended the Army through this war, which was unnecessarily prolonged, can be traced, first, to this want of cooperation on the part of the states, and, second, to the lack of efficient and experienced officers to place in command of the new and undisciplined troops. The Military Academy at West Point had been established in 1802, but up to 1812 it had graduated only about 140 officers. As a rule any man who could enroll a company of 59 men received a captain's command; any man who could assemble 10 such companies received a colonel's command. These were the only qualifications necessary to become an officer in time of war. The 500,000 men employed during the two years and a half of the war were called out to face not more than 67,000 British regulars.

With this demonstration before him, ex-President Jefferson, who had formerly stated that "peace was his passion," and who had not believed it necessary to keep the nation prepared for defense, wrote to James Monroe:

It proves more forcibly the necessity of obliging every citizen to be a soldier. This was the case with the Greeks and Romans and must be that of every free state. We must train and classify the whole of our male citizens and make military instruction a regular part of collegiate education. We can never be safe until this is done.

And in 1814 he went even further and said:

I think the truth must now be obvious that we cannot be defended but by making every citizen a soldier, and that in doing this all must be marshalled, classed by their ages, and every service ascribed to its class.

The Mexican War did not put the nation to any great test. That our military policy had not been improved was shown by the fact that Congress again waited until the very eve of the war before making preparations or calling for volunteers. But the people had grown in their sense of duty toward the nation, and responded enthusiastically to the call for volunteers. Before they could be put out in the field for any practical use, however, the war was over. Our small standing Army had been brought to a state of efficiency by officers graduated from West Point. It was due largely to them that the war was so quickly won.

In the early days of the Civil War the same mistakes were made as in the previous wars. There was still no definite military policy. The outbreak of the war found no adequate provision made either in organization or in materials. The President was compelled to rely upon a law 60 years old, which permitted him to call out volunteers for a period of three months only. When it became evi-

dent that all former provisions were inadequate for a war of such magnitude, President Lincoln courageously assumed powers not granted him and enlarged the Regular Army and called for volunteers to serve for a term of three years. So alarming had the situation become that the people gratefully sanctioned his entire course. The war was prolonged over a period of years, and the outcome looked doubtful. While many thousands of men were loyally giving themselves to fight for the Union, many other thousands were shirking their responsibility. When all other measures failed, Congress was compelled to resort to the "draft" or "conscription." Although this measure was greatly resented by many of the people as attacking their liberties, it was further recognition of the principle that every male citizen owes military service to the nation.

As far as military policy was concerned, little was learned from the Civil War. The Spanish-American War found the nation again unprepared for effective action. It was necessary rapidly to fill the vacancies in the Regular Army with raw, untrained recruits.

No consideration was given to training, for there was no time for this, only to send the raw material forward as soon as possible, thanking God for the character of our foe.

Though not a battle was lost and the war lasted only 109 days, many lives were sacrificed and much material was wasted because of tardy preparations and obsolete methods and equipment.

From the foregoing it appears that up to this time relatively little progress had been made in solving the problem of national defense. With the fear of militarism definitely established in their minds, the people repeatedly refused to sanction a large standing army. On the other hand, they recognized the need for common defense and accepted it as a basic duty of citizenship. The law of 1792 undertook to solve the problem, but enrollment and training in the local units were compulsory and necessitated a measure of control by the Federal Government which the states were unwilling to concede. Up to 1916 little was done to harmonize these conflicting conceptions. Those who were directly responsible for the nation's safety urged the maintenance of a standing army large enough to meet any emergency. After each war investigations were conducted to fix the responsibility for the needless loss of life and the reckless expenditure of money. For several years prior to 1916, state troops, which had come to be known as the Organized Militia, had been active in securing from their state governments some of the concessions necessary in order that the Federal Government might weld these forces into a homogeneous whole, capable of efficient service and available upon call of the President. These forces came

to be known as the National Guard, which the Federal Government, with the consent of the states, trained within the limits of Congressional appropriations. In 1916 it was necessary to mobilize on the Mexican border the whole of the National Guard. During the resulting months of Federal service it proved to be an effective force.

The first real effort to formulate a definite military policy consistent with the traditions, customs, and ideals of the people was the national defense act of 1916. Before this law could be carried into effect we were plunged into the World War. In spite of our unpreparedness, we met this test with that spirit of service and sacrifice which makes this nation strong. This was the first time in our history that we were able to organize armies in the beginning of a war on the principle of the draft, and this point, in spite of errors consequent upon hasty organization, marked a definite step forward.

With the lessons of the World War still fresh in mind, attention was directed again to the establishment of an adequate military policy. The act of 1916 was amended June 4, 1920, incorporating the lessons of the war experience and providing for effective cooperation between the states and the Federal Government. It is now possible to develop in time of peace a citizen army that is adequate for protection in times of war, yet wholly democratic. Such an army of the people and controlled by them is the best security against aggression from without and against autocratic, militaristic usurpation from within.

Let us realize that the words of the weakling and the coward, of the pacifist and the poltroon, are worthless to stop wrongdoing. Wrongdoing will only be stopped by men who are brave as well as just, who put honor above safety, who are true to a lofty ideal of duty, who prepare in advance to make their strength effective, and who shrink from no hazard, not even the final hazard of war, if necessary, in order to serve the great cause of righteousness.—Theodore Roosevelt.

The Value of Military Training to a Civilian

EDITOR'S NOTE: The following address of John W. Weeks, Secretary of War, was recently read on his behalf by Colonel Dwight F. Davis, Assistant Secretary of War, before the Association of Military Colleges and Schools of the United States at Washington, D. C. It is believed that could these remarks reach throughout the United States thousands of well meaning but misinformed people would hold a different attitude toward military training than they do at present.

I DO not believe that all thinking Americans fully appreciate the beneficial effect of military colleges and schools upon our normal life in purely peace-time pursuits and activities. Such institutions are on the blue side of the public ledger. They more than counterbalance many subversive influences and educational evils that are distinct American liabilities and others that must be classed as national risks, decidedly speculative in character and unlikely ever to be assets.

Military training from a national standpoint would be worth every cent that has been expended and is being expended upon it even if war were abolished and we knew for a certainty that this country would never be called upon again to defend its rights and independence with the sword. No more convincing evidence is needed than that military schools and colleges are notably free from the many unsound theories, ideas and practices that thrive like choking weeds in some of our other educational institutions. The Americanism of the military institutions has never been questioned. As a matter of fact, the Reserve Officers' Training Corps is now recognized by the trustees and faculties of our large universities as exercising a most wholesome influence upon students—which is the critical age from a character standpoint.

I am also one who believes that because of its intrinsic educational and character-building merit, military training makes for the individual's personal success. Soldierly qualities are valuable in the office, the shop and the farm as they are on the battlefield. The same, not a different kind of man, is needed in peace as in war. There is no doubt that military training strengthens a man physically, mentally and morally and develops those habits of thought and action which make him a more efficient, capable and reliable man to work with, for, or under.

The preparation that fits anyone to hold his own, and to co-operate with his associates for their mutual benefit, when his life,

their lives and that of his country are at stake will surely stand him in good stead at less trying and less critical and simpler tasks. Undoubtedly soldierly qualities can be and are developed by experience, but the school of hard knocks is slow and sometimes painful and its teachings are usually untimely and unscientific. Military training teaches a man to find himself in the most formative period of his life. I know of no substitute in our educational system that will so effectively help a young man before he has actually entered his life work.

In this connection, it is well to recall that *the most enthusiastic advocates of military training are the veterans of our wars*. They are certain that it will make their sons and their neighbor's sons more capable and useful citizens. They have had its value to the individual personally proven, although of course in their advocacy they are not unmindful of the needs of the national defense.

We at the War Department are often annoyed by some judge offering to refrain from sentencing a young offender on condition he will enlist in the Regular Army. We are justly annoyed because the Army is not a corrective institution, because of our strict requirements, because the American uniform is a badge of honor, because the Army code of conduct is so exemplary, and because of the unintentional reflection upon the character of our soldiers. But actually the judge is paying the Army a genuine compliment. He has recognized that the boy is worth saving and believes that he can be made a useful and law-abiding citizen. The judge realizes that military training and discipline will bring out whatever latent good the culprit possesses and help him find his better self, even when his own community has not and probably can not.

I know that you are also annoyed by somewhat similar instances. Parents whose sons have become unruly and are in danger of becoming even worse, are advised to send these boys to a military school. This you resent, because your schools are not houses of correction, because of your strict and high entrance requirements and standards, and because of the excellence of your student bodies. However, here again is recognition of the man-making worth of military training, that you can save the boy and make him a useful man, although his own parents, associates, schools and environments have failed.

I have discussed from time to time the value of military training to civilians with business men who have large commercial organizations. Those employers who have given the subject serious consideration, who have compared men with and without military training at the same tasks, and the work of certain other men before and after receiving military training, inform me that it increases the

efficiency and capabilities of their employes as civilians. The number of organizations which permit their employes to attend our summer training camps at full pay increases each year.

This policy is adopted by large corporations not only for patriotic reasons, but because it is proving to be a paying investment. Undoubtedly one of the important accomplishments of military training is its physical results upon the individual. Not only does it develop a boy physically at his most critical age, but also impresses upon him the necessity of keeping in condition throughout life. The advantages of starting any career with a sound body and keeping sound throughout the span of life cannot be over-stressed. I sometimes think that our educators as a whole do not appreciate the vital relation of the body to the mind. Not only does a sound body result in more working hours during a man's life and thus materially extend his effectiveness, but it also makes for clearness of thought and purpose and increased efficiency. At our Citizens' Military Training Camps it has been demonstrated that even a month as a soldier will produce noticeable and lasting physical benefits. Soldierly habits, once acquired, are not easily lost.

In this connection, the commendable pride in appearance that is instilled should be mentioned, as it is a practical asset. A favorable physical impression made upon associates and those with whom one has business dealings increases their confidence and their possessor's earnings. An erect carriage, courteous manner, poise, neatness of dress, and a generally excellent appearance have money values of their own in their effect upon others, but even more important psychological results in the individual himself. They give him self-respect and self-confidence. He approaches his problems with more assurance and fewer doubts in his own ability.

The value of military training in its broadest sense neither begins nor ends with the physical, as it includes much more than sufficient exercise, proper eating, and regulated hours. Its effect upon character are much more important, although difficult to catalogue or define. Self-discipline and self-control are its products and deserve the highest ratings.

The object of all military training, as far as the individual is concerned, is to give him that strength of character and purpose, that power over his own emotions and actions, that will result in his being normal under the most abnormal conditions, calm during the most exciting of events, attentive to duty under the most distracting of circumstances, and determined to perform the definite tasks assigned to him in spite of all handicaps, against opposition aimed at his destruction. That is not only the aim, but the accomplishment of military training. Such training certainly should give

the same individual the proper mental attitude for meeting the normal problems of a normal peaceful life without fear or tension and with that easy confidence so necessary for success.

Regular Army officers will testify that the recruit senses, even before he understands, the purpose and objects of military training—even of squads right and left—and feels the change or rather development taking place within himself. He takes on a new confidence as a result of this feeling of newly acquired strength, power and control. The real soldier knows the value of discipline to himself and exercises it of his own volition. There is no necessity to force it upon him after his recruit period. He even becomes critical of the lack of discipline outside of an army post and in his civilian acquaintances. He compares himself unconsciously with them and is certain that he is the possessor of a precious something that is missing in them and that the difference in his favor is large. He will never cease to be a soldier until the end, although he may leave the Army never to return. He is proud of having been a soldier, proud that he still is one.

Nor is that all. There is the pride in skill that can be noted in the “snap” of the rifle. There is the pride of accomplishment noted in the pleasure that comes at the end of a long hike made without falling out, and when “expert” is made on the target range. There is the pride of duty noted in the dispatch with which all orders are executed. There is the pride of responsibility noted in the performance of his full share of the work of a squad, platoon or company and the watchful care exercised over comrades it is his privilege to command. There is the pride of cleanliness noted in the spotless uniform, the shine of the rifle, and the orderly bunk. There is the pride of fairness, truthfulness, honesty, and honor noted in all his intimate dealings with his comrades in arms. There is the pride of service noted in the sympathetic and brotherly helpfulness that permeates a barracks.

These and more a soldier acquires because of what is termed military training. These and more you give to your students in your colleges and schools. These and more they carry away from your campuses along with the knowledge acquired from text-books, lectures and classes.

Because of the former they will make better use of the latter. In fact, it might well be said that military training is more valuable to the civilian than to the soldier, for the civilian is thrown upon his own responsibilities to make his own way more or less alone, and has greater need for the qualities that have come to be called soldierly. He is in competition daily, as well as in cooperation, with his associates.

I am of the opinion that your schools are even more important to the United States than similar schools would be in other countries, because we have nothing in the United States that approaches universal military training, and there is much evidence of lack of discipline. You are continually leavening our citizenship with disciplined men. Increasing urban life tends to lower the physical condition of our people. You are constantly developing fine physical specimens and sending them out as advocates of physical strength not only for themselves but for others.

Our country is founded upon the theory that it belongs to the people not the people to the state, and differs from all other countries except England in that respect. Our citizens consequently have more individual freedom and rights than those of any other nation. They have need for a greater sense of civic responsibility. They need the restraining influence that comes from military training, its belief in the law of service and cooperation, its respect for the rights of others, its feeling of comradeship, and its proper pride in self and national accomplishment.

In the restlessness and instability of youth lies the greatest danger to any government. Unless guided and directed along rational and patriotic paths, then security for the future is endangered. Our program takes on a national importance from the sole viewpoint of citizenship, and calls for the most earnest consideration by every thinking man and woman. The principles underlying this undertaking are sound and its success will be productive of permanent and beneficial results. I regard the system of military training in all its phases as the most wonderful school in existence for the development of the ideal virtues required for good citizenship.—General J. J. Pershing.

Coast Artillery Shooting

By MAJOR R. B. COLTON, C. A. C.

EDITOR'S NOTE: *The first part of this article was published in the May, 1925, issue of the JOURNAL.*

SPOTTING

OBSERVATION of fire may be carried out by horizontal base, pseudo-horizontal base, vertical base, or landscape methods. First, in regard to horizontal base, or pseudo-horizontal base methods, let us take the case of a low-sited battery engaged with a single battleship at a range of 12,000 yards. The battleship is about 200 yards long and has a free-board of about 10 yards. If the battleship is approximately broadside and the base line is 3000 yards, the lower part of splashes over by less than about 600 yards will be concealed from both stations and the upper part of such splashes will most probably be concealed from at least one of the stations by the ship's superstructure, gun smoke, or boiler smoke. The chances are excellent that all short shots can be observed from both stations, for the battleship cannot shoot at the battery if its view is obscured.

Next take the case of the same battleship head on to the base line. The majority of shots that fall from 100 yards short to 200 yards over with respect to the center of the battleship will be most probably obscured from one station or the other and their deviations cannot with certainty be measured, but they will however be silhouetted against the ship from one or the other stations and can be identified as hits or overs for range to an accuracy of 100 yards or better. Many shots falling over will be concealed from at least one station by the ship's smoke or by its superstructure. Shots actually short of the nearest waterline of the ship can be observed from both stations.

If one station is near a line through the battleship perpendicular to the line of fire of the battery the range of overs and shorts can be measured unless obscured by smoke except that some splashes will be obscured by the battleship. The splashes obscured by the battleship can be reported as hits for range with an accuracy of from ± 15 to ± 100 yards, according to the presentation of the ship. This case—flank observation—represents the best conditions for observation of fire, but obviously it is a very special case—however, not to be neglected when available.

If the horizontal base stations are at a great height conditions for spotting are a little better since the free-board of the ship will obscure splashes less as the angle of depression becomes greater. However, the ship's superstructure and boiler smoke will still obscure many if not most overs.

Where depression position finders are used near the battery there is a zone behind the target in which overs cannot be waterlined. Thus suppose the range is 12,000 yards and the height of site 200 yards. Then there is a space 600 yards behind the target which will be obscured by a 10-yard free-board. Splashes actually short of the ship can of course be measured, but there is a zone short of the aiming point and to one side or the other of the ship according to its presentation in which splashes cannot be waterlined.

Landscape methods are methods of estimation by means of the relative position of the splash and other objects or distances in the nearby landscape. Aerial observation is the most typical of these methods, but the most practical from a coast artillery viewpoint is the method of spotting from a high bluff by means of the silhouette of the splash against the ship.

Aerial observation is a story by itself. It is enough to say that as it is not essential to ordinary coast artillery fire its use is a waste of good material except in special cases.

Where silhouette spotting is available, shorts can be distinguished as such and all other splashes may generally be assumed to be over.

It is not to be expected that any one of the preceding conditions will hold for any great length of time and hence in the course of a quarter of an hour the conditions outlined in the following table may appear in succession:

CASE	SHORTS	HITS	OVERS
1	sensed	sensed \pm x yards	sensed
2	measured	measured	measured
3	measured	sensed \pm x yards	measured
4	measured	sensed \pm x yards	none
5	measured	none	none
6	none	sensed \pm x yards	sensed
7	none	none	sensed
8	none	measured \pm x yards	sensed
9	lost	lost	lost

Note: "x" in column 2 may have any value from 15 to 100.

A good spotting system will be arranged to make use of any or all of the above methods of spotting. So far as terrestrial observation is concerned the essentials of a spotting system are stations, observers, observing instruments, and a spotting board.

When spotting is accomplished by means of either a horizontal base or a depression position finder the results may in some cases be furnished either in the form of deviations from setforward data or in deviations from the target itself.

The experience of the Coast Artillery is all in favor of correcting fire on the basis of the setforward data. This scheme has been successfully used for many years, but due to the lack of personnel and plotting boards has in the past only been applied during trial shots. Whenever it is possible to furnish measured deviations with respect to the target it is equally possible to furnish measured deviations with respect to the setforward point if the spotting section is properly equipped. Considering the case of a horizontal base system, spotting through the medium of an ordinary board may be carried out as follows:

1. The fire adjuster plots on a time range sheet the ranges set on the guns, these being telephoned to him by the range recorders.

2. The fire adjuster obtains from the spotting section the time and range to each splash, as determined from an ordinary plotting board, and therefrom plots the splash ranges on the time range sheet.

3. The difference between curves 1 and 2 represent the correction to be applied to the actual range to the setforward point. This difference being determined, it is transmitted to the range correction device and to the Pratt Range Board.

REMARKS ON THE ABOVE SYSTEM:

The present standard system of fire control does not provide for correction of fire by observation and hence it has been found necessary to insert a range correction device somewhere in the chain of communication of firing data. It is customary to parallel this device with the Pratt Range Board. The fire adjustment data is first set on the range correction device and then run through the Pratt Range Board at leisure as a muzzle velocity correction, to be returned to the range correction device when the range and azimuth have changed sufficiently to cause a change in correction. This, or a similar modification of the standard system, is necessary whenever fire is to be corrected by observation, no matter whether it be corrected to the setforward point or to the past position of the target.

The system outlined is practically identical with that used in connection with trial shots. In fact when using this system trial shots may be fired at any time during fire for effect by ordering an arbitrary correction sufficient to bring the splashes in a position where they may be identified.

Corrections may be applied after each shot, or in any other manner, without disturbing the process of adjustment of fire, as the range set on the gun and the range of the splash are the only arguments affecting fire adjustment in this system. Corrections, and errors of the range section are both eliminated from the adjustment of fire.

If the ranges on the time range sheet are plotted to a percentage scale the corrections may be read off in percentage.

It is not necessary that the ranges be kept according to time, but this is a convenient arrangement. In lieu of the time range sheet a device similar to, but simpler than the Coast Artillery Board percentage fire adjustment device may be used.

Gun differences may be neglected in plotting the gun ranges if the guns are less than a hundred yards apart and are fired at approximately the same rate of fire and the directing point is taken midway between the guns.

In pseudo-horizontal base systems it is customary to use spotting devices in which the area around the target is represented to a very large scale, thereby enabling the spotting section to read deviations to the closest yard or fraction thereof. Such large scale plots are, however, either of enormous over-all dimensions, or clumsy and slow in operation, or inaccurate in principle, or suited only to special situations. Further, the fundamental data does not warrant such accuracy. In practice it is customary to use for spotting purposes (in connection with these devices) the interior scales of azimuth instruments the least reading of which is $5/100$ of one degree. This fact alone renders it impractical in general to obtain deviations accurate to better than 20 or 30 yards, and when the average error of 20 or 30 yards in the setforward point under the best conditions is also considered it becomes evident that the refinement of reading obtainable on these large scale devices is of little value.

As a matter of fact since fire as a rule is only adjusted on the basis of four or more shots it would be more logical to use for spotting purposes a device of one fourth the scale of the regular plotting board, the term scale here being used in the sense of "inches to the mile."

When a simple horizontal base system is used the complete spotting section can be made to consist of the observers, one spotter and one armsetter. This comes very near being a minimum of personnel for any spotting system. However, it is advisable to add to the spotting system another armsetter and the necessary readers as this will not only improve the speed of spotting but will also make the spotting and plotting sections interchangeable.

In general whenever instrumental spotting is used, it will be found that with little or no expense spotting and range finding personnel and equipment can be made interchangeable. Such a procedure will add little to the efficiency of a battery in target practice, but under combat conditions it would probably increase the effectiveness of the battery one hundred per cent.

When more than one battery fires at the same target it becomes very difficult to identify splashes. In our target practices this has been accomplished by keeping track of the time of flight and warning the spotting stations near the end of the time of flight. This system works after a fashion, but obviously is an incomplete solution of the problem. If it is contemplated that observation of fire for effect will be necessary when two or more batteries are firing at the same target arrangement should be made to fire the batteries in such manner as to prevent the shots from different batteries arriving at the same time. This can readily be accomplished by means of a suitable time interval system and bell fire, the ringing of the bells being back set proportionally to the time of flight and arranged so that splashes will occur at five-second intervals or multiples thereof.

In general, however, the simplest and best method of fire adjustment to employ when firing a number of batteries at the same target is to cause each one in turn to fire a salvo with various leading deflections and ranges, different for each battery. This method will waste less ammunition in the long run than an attempt at observation of fire, and, if the regular range finding personnel is duplicated in the spotting section of each battery, fire need never be slackened when thus testing adjustment.

FIRE ADJUSTMENT

Errors in coast artillery fire are either constant, variable or accidental. If we cast out errors due to negligence it is hard to find remaining any constant error except the error introduced by the erroneous determination of the error in adjustment. Variable errors usually have a time and space factor. Accidental errors by their very definition are various and indeterminate, but generally increase with the range and in the long run obey approximately certain known laws.

Adjustment of fire has chiefly to do with the minimization of the variable error. The methods of accomplishing this result have become known as the methods of fire adjustment. First and foremost among these are trial shot methods.

The trial shot method most commonly used in our target practices consists in firing trial shots as soon before record practice as possible and as near the mean range of record practice as possible, the idea being that the variable error will have components varying with the time, range, and azimuth, and that by reducing the variation of time, range and azimuth to a minimum we will reduce the variation of the variable error to a minimum. This manner of firing trial shots works well for target practice and is also applicable in combat whenever shots can be fired ahead of the target on its future course.

The principal point to be considered in connection with this method is the number of trial shots. As the method depends wholly on trial shots, accuracy demands that a large number be fired for the purpose of determining correctly the center of impact and thus eliminating the constant error of adjustment. But on the other hand, there is a gain in accuracy due to speed because the speed of firing trial shots influences both the time and space variation between trial fire and combat fire, and of course the conservation of ammunition and accuracy life calls also for a small number of trial shots. The following table shows the average and maximum errors of adjustment due to accidental causes, i.e., the error in the determination of the center of impact, for any number of trial shots, and the percentage of hits to be expected, for the conditions as stated in the table.

TABLE 1

Battery—6-inch D. C. Guns. Range—6000 yards. P. E. of Guns—50 yards. Target—Large destroyer, boardside. Danger Space—100 yards. Range-finding and personnel errors—None. All errors accidental.

YIELD OF HITS FOR A LARGE NUMBER OF RECORD SHOTS

Number of Trial Shots	50% certainty of more than	70% certainty of more than	90% certainty of more than	99% certainty of more than	Adjustment Error	
					Prob- able	Maxi- mum
1	41% hits	37% hits	15% hits	2% hits	50 yds.	200 yds.
4	48% "	45% "	37% "	23% "	25 "	100 "
9	49% "	48% "	43% "	35% "	17 "	68 "
16	49% "	49% "	45% "	41% "	12½ "	50 "
Infinite	50% "	50% "	50% "	50% "	0 "	0 "

Inspection of the above table indicates that four trial shots is about the right number as the worst possible adjustment obtainable from four trial shots will only cut the expectation of hits to 23 per cent or about half the maximum expectation, and on the average 90 per cent as many hits will be obtained by adjusting with four trial shots as by adjusting with an infinite number.

It is not always possible to apply the method of trial shots just outlined. Strictly speaking, this method involves the firing of trial shots ahead of each successive target, and is therefore wasteful of ammunition. This fact has given rise to a trial shot method whereby trial shots are fired at a point in the middle of the battery's field of fire and certain assumptions are made as to the variation of the variable error of adjustment.

The most common assumption is that the variable error of adjustment varies as do errors in muzzle velocity. There is some evidence in favor of this assumption, particularly where old lots of powder are used, but study of target practice reports indicate that there are many cases in which the errors are most certainly not due to errors in muzzle velocity. In fact, inspection of target practice reports of major caliber batteries frequently reveals adjustment errors that can by no stretch of the imagination be attributed to errors in the mean muzzle velocity, meteorological messages, or to the sum of such errors.

Experience has shown that the variable error will often change sufficiently to materially reduce the expectation of hitting. For this reason, when trial shots cannot be fired at the mean future location of the target and immediately before fire for effect it is highly desirable to correct fire by observation, but we must remember that an adjustment obtained by observation of fire for effect must always lag the actual fire as regards location and time, whereas it is often possible with trial shots to eliminate the lag in location, with no greater lag in time than in the case of correction by observation of fire for effect, hence correction by trial shots will always be the better method, other things being equal.

In the rare case in which measured deviations can be obtained—practically speaking only with unobscured flank observation—dependence should never be placed solely on trial shots. If trial shots were fired at a point near the location of the target immediately previous to its arrival they should perhaps be given double weight, if fired some hours ahead of time, a weight of unity, if fired a month previously perhaps a weight of one-half.

The number of shots, trial or otherwise, to be considered is likewise a matter of judgment. Inspection of Table 1 shows that fire adjusted on the basis of four shots correctly observed will give in the long run (for the battery and conditions illustrated) 90 per cent as many hits as would be obtained from fire adjusted on an infinite series of shots. Now if fire is always corrected on the basis of the *last* four shots the conditions of the long run will be very closely approximated by as few as four trial shots and ten shots for effect, since the adjustment will be varied a half dozen times during the firing of the ten record shots, even if a lag of four shots is allowed for application of correction.

If fire is based on strings of four shots instead of the last four shots a little more is left to chance—i.e., the “long run” is obtained only one-fourth as well as when correcting on the last four shots—but either method is good enough if the deviations are accurately measured.

It has, however, been pointed out that there is only one condition for which deviations can be accurately measured—the case of unobscured flank observation with the battleship broadside to the battery.

In all other cases there is considerable error in the “measured” deviations, and correction cannot be made by the usual method of averaging deviations. Resort in these cases must be had to a method analogous to the method of shorts.

The method of shorts is applicable when and only when the short edge of the target is inside the zone of dispersion, and it is possible to identify all shorts without confusion with hits and overs. Practically speaking, this condition arises (for a single battery and battleship) when trial shots have been fired with the lot of powder and projectiles to be used in combat and the course of the battleship is nearly broadside to the battery and observation is obtainable from a station of moderate height at the battery or from a base line near the battery, or from a good flank station or base line. When the ship is advancing at a sharp angle with the line of fire shorts and overs will generally be confused, but in certain special cases this confusion will be of a compensating nature and the rules for the method of shorts can still be applied.

Even assuming that all shorts can be identified and that there will be no confusion of shorts and hits or overs the application of the method of shorts is complicated by the fact that the desired per-

centage of shorts changes with the presentation of the ship. This phase of the matter is illustrated below:

TABLE 2

TARGET	Length....	200 yards
	Width....	30 yards
	Height....	center— 15 yards ends— 10 yards
GUN PROBABLE ERROR		100 yards

(a) DANGER SPACE

Slope of fall.....	6:1
Danger Space Broadside.....	120
Danger Space Head On.....	260

(b) DESIRED DISTRIBUTION OF SHOTS

Slope of fall.....	6:1	
	Broad	Head
Shorts.....	34	19
Hits.....	32	62
Overs.....	34	19

The conditions of Table 2 are not unusual, and inspection shows that in this case a change of 90 degrees in the angle of presentation of the ship will change the desired percentage of shorts from 19 per cent to 34 per cent. Thus we see that the method of shorts, followed to its logical conclusion, involves the preparation of a large amount of data in advance of action, and the consultation of this data during action.

However, even if this data is carefully prepared and conscientiously consulted, the method of shorts will still be quite inaccurate. For instance, if one-third shorts are to be expected when fire is correctly adjusted and further, if this most desirable circumstance has occurred, there are four possible results of a series of three shots, namely: three shorts, two shorts, one short, no short. The chance of each of the above results occurring is:

3 shorts—	3.7%	2 shorts—	22.2%
1 short —	44.5%	0 short —	29.6%

Now further if the danger space is 130 yards and the battery probable error 100 yards the corrections indicated are:

3 shorts—	470 yards	2 shorts—	130 yards
1 short —	0 yards	0 short —	330 yards

All of these corrections except the one for one short are, by hypothesis, erroneous. We see that there is 22% chance of a 130-yard error, and a 30% chance of a 330-yard error not to mention an error of 470 yards that occurs once out of every 25 times on the average.

Under the conditions just assumed the method of measured deviations would give a 50% certainty of an error less than 60 yards, and a 99% certainty of an error less than 230 yards.

Next let us examine the case of a series of six shots fired under the same conditions.

TABLE 4

DANGER SPACE.....	130 yards
PROBABLE ERROR OF BATTERY.....	100 yards
MAXIMUM AVERAGE % OF HITS OBTAINABLE....	$33\frac{1}{3}\%$
DESIRED % OF SHORTS.....	$33\frac{1}{3}\%$
BATTERY CORRECTLY ADJUSTED	

100 series of 6 shots each

Shorts	Percent of occurrence of series with the indicated number of shorts per series	Total shorts
0	8.8	0.0
1	26.3	26.3
2	32.9	65.8
3	21.9	65.7
4	8.3	33.2
5	1.6	8.0
6	.2	1.2

Grand total shorts in 600 shots. . . . 200 = $33\frac{1}{3}\%$

It is seen from the above table that the expected percentage of shorts will not occur in each series of shots. For the conditions of Table 4 it is almost equally probable that one, two or three shorts will be obtained, whereas only when two shorts are obtained will the correct correction—zero—be indicated. Assuming that the battery commander makes a full correction for each series of six shots the average error of the method of shorts may be calculated by taking the weighted average of the corrections for each possible number of shorts.

TABLE 5

CORRECTION BY METHOD OF SHORTS

BASIC ASSUMPTIONS:

1. Number of shots.....6
2. P.E. of battery.....100 yards
3. Danger Space.....130 yards (none short of target)
4. All danger space included in zone of dispersion
5. Adjustment.....to center of danger space
6. Point aimed at.....center of danger space

SECONDARY ASSUMPTIONS:

From (2) and (3) maximum average percentage of hits— $33\frac{1}{3}\%$

From (2), (3) and (4) maximum correction 330 yards.

Number of Shorts	Correction
0	Down 330
1	Down 70
2	0
3	Up 70
4	Up 130
5	Up 210
6	Up 330 (limit by (4) above)

By combining the figures of Tables 4 and 5 to obtain a weighted average we find that the average error of the method of shorts for this particular case—which is quite a typical one—is 65 yards, with a maximum error of 330 yards, whereas the system of measured deviations would have yielded an average error of 70 yards, with a maximum error of 230 yards.

When the target is not at the ultimate center of impact results are of course different for the method of shorts.

TABLE 6

Danger Space.....	130 yards
Probable error of battery.....	100 yards
Maximum average % of hits obtainable.....	33½
Desired % of shorts.....	33½

CASE 1

Center of target 100 yards short of ultimate center of impact
Probability of shorts— 1-8, approximately.

100 series of 6 shots each

Shorts	Percent of Occurrence of series with indicated number of shorts per series	Total shorts
0	44.9	0
1	38.5	38.5
2	13.7	27.4
3	2.6	7.8
4	0.3	.9
5	0	0
6	0	0

Grand total of shorts in 600 shots.....74.6

CASE 2

Center of target 65 yards over center of impact, i.e., water line of target at the center of impact.

Probability of shorts— 50%

Shorts	Percentage of occurrence of series with the indicated number of shorts per series
0	1.6%
1	9.4
2	23.4
3	31.2
4	23.4
5	9.4
6	1.6

Referring to Table 6, case 1, we see that there can be practically three results; namely, none, one or two shorts, all other possibilities being negligible. From Table 5 we see that for no shorts a 330-yard correction would be ordered, whereas the proper correction (from our assumptions) is 100 yards, and as the probability of no shorts is 44.9%, it follows that an error of 230 yards will result almost half the time. Applying the weights of Table 6, Case 1, to Table 5, we find the average error in the correction to be 150 yards whereas the method of measured deviations would have given an average error of 70 yards as in the previous case.

Combining Table 6, case 2, with Table 5 we find the average error of the correction would be 75 yards.

Summarizing, we may state that the method of shorts compares favorably with the method of measured deviations when the danger space is small compared with the dispersion and the error of initial firing data is less than a probable error.

The most frequent condition that will be met in actual combat is that in which spotting data consists of a mixture of "sensed" and measured deviations of all kinds. This condition cannot be analyzed because it is too indefinite. If the reports are anywhere near complete the center of impact can be guessed fairly accurately. Thus if spotting reports are, over, over, over 600 yards, high hit, lost, lost, lost, lost, estimated short 30 yards, lost, it is evident that the dispersion is at least 600 yards, and at least one hit and one short have been obtained. In this case a range adjuster who really knew his battery could very likely guess the center of impact within less than probable error.

This may not be a satisfactory method, but oftentimes there may be no alternative, and in order to be ready for it battery commanders should prepare in advance of action charts showing for various targets and ranges, the ladders of dispersion and the desired percentages of shorts, hits and overs.

Turning back we see that adjustment of fire consists ideally in measuring the error in adjustment at given times and therefrom predicting what that error will be at a future time. Basically the problem is similar to that of range-finding in which we locate past positions of the target at stated times and predict its future location. It has therefore been proposed that the methods of prediction current in range-finding be applied to fire adjustment. The difficulty in so doing consists in the inherent inaccuracy of the data available, and the fact that when a quantity varies slowly prediction of its variation based on inaccurate data will yield results of greater error than will be obtained by neglecting the variation entirely.

Let us assume a battery probable error of 100 yards and a rate of fire of two shots per minute. Suppose that prediction is made on the basis of four shots. The predicting base is then something over a minute and as the data cannot well be applied in less than a minute we may assume the dead time to be about $1\frac{1}{2}$ minutes. This method is equivalent to averaging the first two and then the last two shots, and the average error of the predicted point is $85 \div 1.5 \times 120$, or 265 yards. On the other hand, if we correct fire on the basis of the last four shots the average error made will be 60 yards plus the shift of adjustment in about two minutes. Obviously this method will never yield an average error as large as that of the method of prediction.

So far in the discussion of adjustment of fire we have not explicitly discussed the point of adjustment. In point of fact all trial shot methods are methods of adjusting on the setforward

point. The method of shorts presupposes that adjustment is made on the target. Adjustment by the method of measured deviations may be either on the target or on the setforward point. Whenever it is possible to measure deviations with respect to the target it is equally possible and equally convenient to measure deviations with respect to the setforward point. Deviations measured with respect to the target are apt to be very unreliable because the center of coordination is a moving point upon which the observing instrument must be oriented for every reading. Furthermore, the target itself is often quite a large amount in error, even when running on so-called straight courses.

The equipment for correction on the setforward point is quite simple—consisting essentially merely of a duplication of the position finding equipment of the battery. As compared with a system of correction on the target the excess cost is for most cases represented by the difference in cost of a standard plotting board and a makeshift “spotting device.” When a battery is equipped for spotting with respect to the setforward point, the time between trial shots and fire for effect can be reduced to a matter of seconds, since the target can be tracked by the range section while trial shots are being fired.

Perhaps the most important consideration in the adjustment of fire is speed. Rapidity of fire enables an adjustment—whether by trial shots, measured deviations, or shorts—to be made quickly, and permits us to apply this correction while the breath of life is still in it.

As a corollary to this consideration we may say that a rapid, universal and accurate method of spotting is essential, and as a corollary to the corollary assert confidently that the only spotting system that will meet this specification is one consisting of standard range finding equipment—not makeshift boards and not interior scale azimuth instruments with an error of a large fraction of a degree.

ARMAMENT ERRORS AND ADJUSTMENT ERRORS

Armament errors are something over which the battery commander has little or no control. Careful adjustment of the gun carriage and accessories may decrease the initial target practice adjustment error and also avoid dangerous accidents, but will generally have little or no effect on the accidental errors of the gun. It is, however, of interest to the battery commander to know the components of his armament error. In regard to such errors we are therefore fortunate in having available the very accurate and thorough report of the “Accuracy Board,” published in the *Coast Artillery Journal* in 1911. The following table is an approximate summary of Board’s findings as to the armament errors:

TABLE 7

Average accidental armament errors, 12'' guns on disappearing carriages.

Range yards	Jump 0. 7'	Projectile —	M V $\frac{3}{4}$ of 1 %	Total —
4000	23 yds.	10 yds.	54 yds.	60 yds.
8000	18 "	38 "	97 "	106 "
12000	12 "	86 "	127 "	154 "

TABLE 8

Average accidental armament deflection errors.

Range	Average Error
4000 yds.	2.5 yds.
8000 "	7.0 "
12000 "	10.5 "

In regard to adjustment errors there are many minds. Some argue that adjustment errors are due chiefly to differences in muzzle velocity, others that they are due to retardation errors.

In truth, adjustment errors are due to a multitude of unknown causes. The very fact that adjustment errors exist argues that their causes are unknown. At the present writing, however, it would appear that the weight of evidence is to the effect that at short ranges muzzle velocity errors predominate in the adjustment error, while at long ranges retardation errors form a large part of the total adjustment error. This leads to an argument for corrections varying as a percentage of the range, which is quite acceptable, since we know that all errors disappear at zero range.

Since the date of the experiments on which the Accuracy Board based its findings, the long core igniter powder charge has replaced the multi-section end igniter charges. Experimental firings by Coast Artillery School students (Wildrick, C. A. JOURNAL, 1916) seem to indicate that the new type charges cut the armament error down 66% at all ranges, but these experiments lose considerable of their value since the new type and old type charges were fired from different batteries. The findings of the Accuracy Board, as shown in Table 7 above, would indicate that entire elimination of muzzle velocity errors could only reduce the armament error 30% at 12,000 yards from its 1911 value. To be sure, since 1911 the long pointed projectile has been introduced with resultant increase of range, but without data to the contrary we would not expect the long projectiles to be materially more accurate than the old capped projectiles at ranges less than 12,000 yards.

Average Armament Errors 12'' Guns.

Range	1911	1924
4000 yds.	60 yds.	67 yds.
8000 "	106 "	77 "
12000 "	154 "	87 "
16000 "	—	100 "
20000 "	—	114 "
24000 "	—	130 "
28000 "	—	150 "

The progress made in projectile and charge design is indicated by the preceding table showing comparison of average errors for 12-inch guns taken respectively from the Accuracy Board findings and from a recent range table:

ALL IN ALL

We may well conclude that the gun and its crew are the most important elements in coast artillery fire. These two set the pace. All other devices and personnel must keep step with them. Barnacles have attached themselves to our fire control system—it is now time to clean bottom.

Personnel errors in practice are of minor importance. Even if comparatively large they have little effect in the long run, and it is not hard to keep them below the danger line.

The horizontal base system is accurate enough for all practical purposes, and our future energy should be expended toward obtaining more powerful and faster guns together with more accurate and more adjustable self-contained range finders.

Our system of fire control would be greatly improved by a duplication of our present range-finding sections and equipment. At present our range-finding section is charged both with adjustment of fire (in connection with trial shots) and range finding. Duplication of the section and equipment would probably increase the volume of fire of our coast defenses 100%. The errors of our range finding system, exclusive of instrumental errors, are at present quite appreciable at long ranges for guns and at all ranges for mortars, but can be brought within reasonable limits by a quite practicable reduction of our predicting intervals, keeping the predicting base at about its present value.

The sinuous course is to be expected in future naval operations on account of its value as a means of protection against submarine and air attacks. It does not constitute an effective means of protection against artillery fire, and the only necessary or practical means of combating it consists in reducing our predicting interval to a minimum and correction of fire on the bases if setforward data, together with an increase in the ratio of guns to mortars.

Too much time has been wasted in the development of spotting boards and systems. The extension of our trial shot methods to include the period of fire for effect is a logical and effective solution of the whole question of observation of fire. Such a system provides in every case better correction for fire than can be obtained by any other means, also provides correction of fire when all other systems fail and forms an invaluable reserve range finding system.

Fire should be habitually adjusted on the basis of setforward data. By habitually is meant whenever measured deviations of shots aimed at the target are available or when observation of fire

in the vicinity of the target is impracticable. The only exception to this rule will be when measured deviations cannot be obtained, but either shorts, hits, or overs, or all three, can be sensed as such. When observation of fire in the vicinity of the target becomes exceptionally poor, fire should be adjusted by firing several shots with a leading range and deflection. Trial shots should always be fired in advance of an attack and again in advance of opening fire, but correction from observation of fire should never be neglected. Correction of fire by the method of measured deviations will be rarely available, but should be used whenever visibility permits. Correction by the method of shorts will frequently be available and in combination with trial shots is a very good method. Advanced trial fire is an effective method of maintaining adjustment to be resorted to when all other methods fail.

Armament errors are only to a minor extent under the control of the battery commander. Careful adjustment of the carriage and proper care of ammunition in advance of action is always practical and from a military point of view costs nothing. Therefore, although they add only a few per cent to the effectiveness of fire, these preparations for combat should be conscientiously made.

Our guns can be fired at top speed just as efficiently as at a snail's pace. Doubling our speed is equivalent to doubling our armament. Why not double?

There are three possible solutions of our defense problem—to wait until war comes and pay the full price; to try to prepare hurriedly at great cost and waste when war is imminent; and to build according to a program year by year, which is the only economical and sound way.—Major General John L. Hines.

EDITORIAL

General Arthur Murray

THE death of Major General Arthur Murray, at his home in Washington on May 12th, meant the loss to many army officers of a sincere friend; to the Coast Artillery Corps of a staunch supporter; and to the country at large of a distinguished, influential, and highly respected citizen.

Upon graduating from West Point in 1874, General Murray entered the 1st Artillery and served in that regiment for many years. He advanced in grade step by step until in 1906 he was appointed a Brigadier General and Chief of Artillery. Upon the separation of the Field Artillery from the Coast Artillery in 1907, he became the First Chief of Coast Artillery, holding that position until 1911, when he was promoted to the grade of Major General. He was retired for age in 1915. At the time of the war with Spain he acted as Judge Advocate General of the First Corps; and later, during the Philippine Insurrection, although then only a Captain, became Colonel of the 43rd United States Volunteers.

General Murray's name is inseparable from that of the Coast Artillery Corps. He was influential in shaping artillery policy during its formative period after the Spanish-American War; he was instrumental in creating our present system of submarine mine defense; he was largely responsible for the separation of the Coast from the Field Artillery in 1907, and for the creation of a separate Coast Artillery Corps; and as the First Chief of Coast Artillery he not only increased and strengthened our system of harbor defenses, but in addition established the Corps on a sound and lasting basis.

His was an enviable record. He excelled in all he undertook. He was cheerful, kind-hearted, of sound judgment, highly intelligent, and diplomatic. With these qualities his long career was of inestimable value to his country. The greatest tribute that can be paid to the memory of General Murray by officers of the present day is for them to strive to reach his attainments and to perform as useful services as did he for the Corps, the Army and the Nation.

1924 Target Practice Report

A most interesting bulletin tabulating the results of target practices for 1924 has been issued recently from the Office of the Chief of Coast Artillery. The practice of every Regular Coast Artillery battery is shown, the tabulation including the location of the unit, date of practice, type of armament, average range, hits per gun per minute, number of shots fired, method of adjustment, and rating. These ratings have been made in the Office of the Chief of Coast Artillery and are based upon a study of the target practice reports themselves and the information and recommendations contained in the forwarding indorsements thereon. No attempt has been made to designate the organizations in order of merit. The bulletin shows that 10 batteries were rated excellent, 35 batteries very good, 178 batteries satisfactory, and 23 batteries were unsatisfactory.

A further study of the bulletin shows that the following number of practices were held: 18 with 3-inch rapid fire guns; 17 with 6-inch guns; 7 with 10-inch guns; 24 with 12-inch guns; 34 with 12-inch mortars; 7 with 14-inch guns; 12 with 12-inch railway mortars; 4 with 8-inch railway guns; 3 with 240-mm. howitzers; 50 with 15-mm. G. P. F. guns, and 59 with 3-inch antiaircraft guns. In addition, 9 mine practices were held.

The bulletin states that many battery commanders were slow securing adjustments because of erroneous data furnished by the spotting sections, and that it is essential that spotting sections be so thoroughly trained that battery commanders can rely upon the data furnished them and make their adjustments with assurance and without hesitation. It further states that in general the practices for 1924 were a decided improvement over those for the preceding year; that improvement was especially marked in the case of anti-aircraft firings at towed sleeve targets; and at the longer range firings of the 155-mm. G. P. F. at moving water targets.

Cash Prizes

The JOURNAL this year is awarding cash prizes in the following competitions: (1) Prize Essay Competition; (2) Target Practice Competition; and (3) Photographic Competition. The conditions governing these competitions are published in this issue of the COAST ARTILLERY JOURNAL.

The Prize Essay Competition is almost traditional with the JOURNAL, having been instituted fifteen years ago. Its value to the Corps and to the officers who enter the competition is too well recognized to permit of argument.

The other two competitions, however, are being inaugurated for the first time this year.

The purpose of the Photographic Competition is to secure photographs for publication in the JOURNAL, of artillery manned by Coast Artillery troops whether of the Regular Service, National Guard, Organized Reserves, C. M. T. C., or R. O. T. C.

The Target Practice Competition, however, is designed to fill a more serious purpose. It is a competition in which it is hoped many of the officers engaged in this year's Target Practices will compete. Its purpose is to secure for publication short articles descriptive of the various types of practices, with the idea in mind that such descriptions will prove of particular interest to JOURNAL readers, and will be of value to them in conducting future practices. These articles are not to exceed 3000 words in length—approximately eight double-spaced typewritten legal cap sheets—and may be shorter if desired. Under present regulations, considerable latitude is allowed battery commanders in the conduct of the practices and in the preparation for the same. If the practice turns out to be especially good, there must be a particular reason for it. It may be the method of training preparatory to the practice was exceptional; or a hypothetical target traveling at a high rate of speed on a sinuous course was assumed; or the spotting was particularly good; or the rate of fire was rapid and the airplane observer's reports reached the battery in time to be used; or there were very few personnel errors; or the hits per gun per minute were large; or the range section was particularly well trained; or the searchlights functioned especially well. These are merely suggestions, indicating conditions that might cause a description of a target practice to prove interesting reading. These are all topics upon which officers engaged in target practice during the present year are qualified to write. Literary style and composition will be given little consideration in determining the awards, the principal factor being whether or not the article so describes the practice or a phase of it in such a manner that it contains suggestions valuable to JOURNAL readers.

The Hawaiian Maneuvers

Twenty-seven years ago a wise government acquired possession of the Hawaiian Islands. They are America's all-important outpost in the Pacific. Their great value from a military viewpoint lies in the fact that they furnish an adequate base for our Navy from which to operate against any enemy threatening our western coast. No enemy would undertake the invasion of this country by way of the Pacific until it had first disposed of our fleet and had

acquired the Hawaiian Islands as a base from which to operate. These islands, seven or eight in number, are all mountainous, being of volcanic origin. A large and deep bay, known as Pearl Harbor, cuts into the Island of Oahu. The entire group affords no other secure anchorage for a fleet. The Hawaiian garrison is concentrated on the island of Oahu, its mission being to hold Pearl Harbor secure for use by the American fleet.

The purpose of the recent maneuvers was primarily to test the defensive strength of the Hawaiian Islands, that is, to determine whether the military forces regularly stationed there are of sufficient strength to repel a powerful naval attack or to withstand an attempt at occupation in force. However, they served a second useful purpose, for they permitted the fleet to carry on under conditions simulating as closely as possible those of war, and gave the Oahu garrison some idea of the problems to be solved in case of actual attack.

As a result of the maneuvers it has been declared that the assailants were victorious—that the defenses are not sufficiently strong to repel an attack in force. No official report, however, has yet been published. Judging from the accounts of the newspaper correspondents who were present, the island is too weak in heavy gun power; an increase in the present garrison of 11,000 men is needed; aviation facilities are inadequate; the dry dock at Pearl Harbor is not large enough to berth our largest warships; and perhaps most important of all, the channel through the coral reef that separates Pearl Harbor from the ocean is not deep enough to permit wounded battleships to seek shelter within the harbor, or even to allow the passage of the larger types of war vessels at low tide. Undoubtedly recommendations seeking improvement of these conditions will be made to Congress. Thus it is that the maneuvers have served a most useful purpose. The Hawaiian Islands are the doorway to Alaska, Washington, Oregon, California, and the Panama Canal. It would be criminal to neglect to study their proper defense in time of peace. Their possession by an enemy in time of war would result in incalculable injury to the United States.

Military Training

[REPRINTED FROM THE *Washington Star*]

Military training for the young men of the Nation is worth all it costs, even if we are never to have another war. That is the dictum laid down by Secretary of War Weeks, and to which thinking people generally will subscribe. Mr. Weeks' statement was in the form of a message to the Association of Military Colleges and Schools and he was speaking particularly of the military training

given in such schools, but his opinion might well have been broadened to cover the training to be had in citizens' training camps by young men unable to attend these special schools.

The benefits of a reasonable amount of military training are varied and the most valuable of them have but little to do with preparation for war. The discipline a young man gets will make him a better and more useful citizen, to his own advantage and to the advantage of his country. The physical upbuilding will go with him as a blessing throughout his life, and the habits of orderliness and deportment he will form will make him a much more agreeable person to get along with.

If the theory that military training of a Nation's youth bred a warlike spirit were a sound one, opponents of such training would be justified in their opposition to it. But it is not a sound theory when applied to the youth of America. Ask any veteran of the World War. They were trained until there were no better soldiers on either front in Europe, but it did not give them any hankering for another war. If this country never goes to war until forced into it by the martial spirit of veterans of the great conflict we will have a long era of uninterrupted peace.

Discipline for Americans

[REPRINTED FROM THE *Chicago Herald and Examiner*]

Secretary of War Weeks in an address before the Association of Military Colleges and Schools reechoed the warning that the crying need in this country is discipline.

Many persons who flatter themselves that they are harbingers of advanced ideas, a finer liberty and a new era of freedom will probably disagree with Secretary Weeks. To them discipline is a synonym for slavery.

Their views, however, are not altogether sound. Although they may be correct in maintaining that the ideal state of man contemplates his perfect freedom, they do not always comprehend that perfect freedom is perfect self-control.

Self-regulation is largely self-taught, like most other worthwhile education that a man may acquire as he goes through life. But discipline is the proper external stimulus to arouse in those subjected to it the ambition to learn to control themselves.

Young men most impatient of discipline almost invariably are those who need it most, because they are most lacking in the power of self-control. Men who rule themselves submit to discipline willingly. They understand its necessity, and discern in it the foundation of what progress most requires of mankind—cooperation.

PROFESSIONAL NOTES

The "Battle Commander" Question

By MAJOR E. J. CULLEN, *C. A. C.*

1. An article published in the April number of the *COAST ARTILLERY JOURNAL* treats of the confusion encountered in attempting to determine the responsibilities and the functions of certain Coast Artillery tactical commanders as set forth in various regulations. The writer traced the cause of the confusion to the use of such special terms as "Fort Commander," etc., and indicated that the confusion encountered is due primarily to the conflicting interpretations that may be made as to the meanings of these special terms. These special terms were devised originally for the purpose of indicating the tactical functions of various coast artillery commanders in the employment of the coast artillery branch of the army in coast defense operations. Any special terms devised will be based always upon certain assumptions as to the tactical functions considered, but these fundamental assumptions should be based upon sound tactical principles if confusion from the use of these special terms is to be avoided. A proper conception of the general function of the coast artillery branch in coast defense operations is most essential to a clear visualization of the tactical functions of coast artillery commanders, and of their relation to the commanders of the other associated combat branches, and particularly of their relation to the superior commander in any coast defense operation.

2. *Training Regulations 10-5*, the document which annunciates the basic principles and doctrines for the guidance of the entire army, sets forth, in paragraph 15, the general function of the coast artillery branch in coast defense operations, as follows:

"Coast Artillery is the artillery charged with the service of the fixed and movable elements of the land and coast fortifications. * * * This branch has the independent role of keeping the area within reach of its guns clear of hostile vessels and of preventing a run-by. When manning the heavy cannon of coast and land fortifications it will constitute a point of support for the associated combat branches. * * *."

The word "Role" is defined as "a function or a part to be played" and the word "Function" is defined as "the performance of a duty"; from which it can be seen that the above-quoted regulation merely stipulates the duties which the coast artillery branch will be prepared to perform in any coast defense operation. But there is a definite distinction between the meaning of the word "Role" and that of the word "Mission". The use of the word "Mission", in a tactical sense, is accepted generally to mean "the delegated responsibility for the performance of a specified duty." In other words, the use of the word "Mission"

implies the delegation of a *responsibility* by a superior to a subordinate. It could not be said that the above-quoted regulation delegates to the coast artillery branch, nor to any tactical commander thereof, any specific *responsibility* for the actual conduct of the defense of any of the water-areas or land areas which may form a part of our coast. In the defense of the coast by the land forces, the full and complete responsibility for the conduct of each and every phase of the entire defense must be vested in the commander of the theatre of operations. That commander alone can assign a mission to the coast artillery forces, that commander alone can delegate to the coast artillery commanders the *responsibility* for the performance of specific duties or for the accomplishment of specific tactical operations. This discussion may appear to be somewhat academic, and perhaps it is, but it may assist us to a clearer visualization of the proper function of the coast artillery as one of the associated combat branches in operations incident to the defense of the coast. Perhaps it may aid in the realization that in any coast defense operation the coast artillery branch is employed primarily as a means of support for the associated combat branches, and of which it is one. At least this discussion should assist in the eradication of any erroneous ideas that may be held as to the existence of an independent mission assigned to commanders of coast fortifications.

3. Artillery, coast or otherwise, is always and is only a means of support for the combat branches associated in the operation, and this support is rendered through the use of the essential characteristic of the artillery, its fire power. The character and the extent of the fire support to be furnished in any phase of the operation is a matter that can be decided only by the superior commander of the associated combat branches engaged therein, and his decision will be based solely upon the conditions and the requirements of the tactical situation at hand. Artillery is always an auxiliary branch, for it possesses certain inherent limitations which prevent its employment as an independent self-sustaining combat branch. These limitations are: its inability to act otherwise than by fire-power; its necessity for firing from position; its vulnerability when exposed in the open; and its inability to protect itself except by fire-action, concealment or escape. An artillery commander has no independent role as a tactician except to so dispose the units of his command as best to render the fire-support required by the associated combat branches, and to insure a powerful fire-reserve that may be employed by the superior commander to influence the action at any time and place. Therein is the tactical function of the various coast artillery commanders and this function is exercised through the proper organization and grouping of their fire-units. Great fire-power is concentrated in a relatively small artillery-unit, and the long range of artillery fire permits great freedom of action, thereby affording effective fire-support over a broad area and allowing the concentration of the effort of widely dispersed units. The effectiveness of artillery action is procured through the concentration of the fire of the various units, rather than by a concentration of the units themselves. This is to say that the effectiveness of artillery action should be sought through the proper tactical organization of the artillery force employed; and in this organization the actual location of these units on the terrain is a secondary consideration. The prospective use of the fire-power of these units is the paramount consideration.

4. The above-referred to article, published in the COAST ARTILLERY JOURNAL, dealt with this tactical organization of coast artillery units, and the encountered confusion was found to be due primarily to the interpretations that might be given to such special terms as Fort Command, Battle Area, Battle Commander,

etc., terms which have been introduced into the coast artillery chain of tactical command. These special terms have been derived from what might be called the "ground organization" of the coast artillery units. That is to say, these terms have been derived from a consideration of the relative location of the various units upon the terrain and from a desire to concentrate conveniently-located units into suitable tactical commands. But the tactical organization of artillery must have for its purpose the concentration of the fire of the various units, rather than the concentration of the units themselves. This suggests the simple remedy of discarding these special terms derived from a consideration of the "ground organization" of coast artillery forces, and of resorting to the use of terms that are indicative solely of practical organizations, preferably terms that are in general use in the current military vocabulary.* The use of such terms should have the distinct advantage of insuring their correct interpretation, not only throughout the coast artillery branch, but throughout the entire army. It would place the coast artillery on a common footing with other combat branches, and this participation in use of the same language should do much towards fostering a spirit of cooperation with these various branches. From another standpoint, it is extremely desirable that the terms used to denote certain tactical functions in coast defense operations be the same as those now used to denote similar tactical functions in the other operations that may be required of such special branches of the coast artillery as the railway artillery, tractor artillery, trench artillery and antiaircraft artillery.

5. Throughout all the combat branches of the army, except the Air Service, which is still in the formative state, the terms "Battalion," "Regiment," and "Brigade" are employed to denote the elements of the chain of tactical command. If these terms are practicable for use in denoting similar tactical functions in coast defense operations, it would appear to be most reasonable to employ them for this purpose. After a consideration of this matter it is believed that the term "Battalion" is a reasonable and logical substitute for the term "Fire Command," and that the term "Brigade" is similarly a proper substitute for that of "Coast Artillery District." The term "Regiment" appears to be a suitable substitute for the term "Coast Defense Command," particularly because our coast defense commands are now controlled by the commanders of the coast artillery regiments stationed therein. If, in time of active operations, it becomes necessary to reinforce the coast artillery regiment located in a present "Coast Defense Command" the term "Brigade" would automatically replace that of "Regiment." There remains to be considered only the term "Fort Command" or "Battle Command," whichever may be desired. In either case, this command is a unit consisting of two or more "Fire Commands" or "Battalions," and though generally smaller than a regiment, in some cases may consist of more than three battalions. Throughout all the combat branches of the army, including all the special branches of coast artillery except the Fixed Artillery, an artillery unit of this character is now well known as a "Groupment." It is believed that it is practicable to utilize this term in the Fixed Artillery tactical organization, for certainly the term "Groupment" is as appropriate for use in denoting fire-power as is the term "Fort Command" or "Battle Command." It has the distinct advantage of being a term now in common usage by all the combat branches and, to say the least, its meaning will be understood by all.

*Steps already have been inaugurated to bring Coast Artillery terminology up to date. For instance, recommendation has been made that the word "group" be substituted for "fire command", and the word "harbor defense" for "coast defense." See the article by Col. Mitchell in this issue of the JOURNAL.—The Editor.

6. Based upon a consideration of the above-mentioned matter, the following conclusions are reached:

a. The use of the present special terms "Fort Command," etc., which are based upon a consideration of the "ground organization" of coast artillery tactical units, leads to confusion in attempting to determine the functions of coast artillery tactical commanders.

b. These special terms, now in use, were devised originally because of the non-existence of permanent organizations larger than batteries within the coast artillery branch, a condition that has been corrected recently by the organization of permanent regiments in the Fixed Artillery branch of the coast artillery.

c. There appears to be no sound reason why the terms now employed in common by all combat branches, and particularly by the various special branches of the coast artillery, to designate the various tactical units, should not be utilized in denoting similar tactical units employed in coast defense operations by the coast artillery branch.

d. Since the coast artillery branch is now on parity with the other combat branches in so far as permanent organization is concerned, it is believed to be most advisable and advantageous to discard the use of the present confusing special terms and to utilize instead appropriate terms that are now well established in use throughout the entire army.

General Ludendorff at the Capture of Liege

The basic plan of the Germans in their great offensive against France in 1914 was the envelopment of the Allied left. This contemplated a wheel by the German First, Second, Third, Fourth and Fifth Armies with the fortified area Thionville-Metz as a pivot. The German First Army, commanded by General von Kluck, was on the extreme right; the Second Army, commanded by General von Bulow, next to it. Being on the marching flank of the wheel, rapid progress was demanded of these two armies, if the plans for the quick conquest of France were to succeed. The fortress of Liege stood in their path. Its reduction was undertaken while the First and Second Armies were mobilizing and concentrating. The task was entrusted to General von Emmich. Forces for the purpose were drawn primarily from the Second Army, but these were reinforced by two infantry brigades from the First Army. Lieutenant Colonel Walter S. Grant, Cavalry, Director of the Command Division at the Army War College, in a lecture delivered at the Army War College on a study of certain features of von Kluck's march on Paris, made among others the following interesting statements concerning this phase of the operations:

On August 4th the advance over the Belgian frontier began. German cavalry under von der Marwitz crossed the border and moved upon Vise, north of Liege. It found the bridge over the Meuse at Vise broken, and the western bank held by Belgian troops. There was fighting. Two cavalry regiments went north to Lixhe, three miles north of Vise, where they crossed the river by a ford. The Belgians found their left threatened and fell back on Liege. By evening of the 4th the heads of the columns of von Emmich's force which had crossed the frontier were nearly two miles into Belgium.

General von Emmich decided to make a night attack on Liege. His force was divided into five columns. On the night of August 5-6, these five columns, assisted by the demonstration of weak forces drawn therefrom, against the forts,

attempted to advance between the forts, with the object of seizing the town and the citadel of Liege. The town once captured, the plan contemplated the attack of the forts surrounding the town, from the rear.

Of the five columns, the two advancing from the north and northeast were unsuccessful; the two advancing from the south were worse than unsuccessful; and the one advancing from the east was almost unsuccessful. However, this column did finally succeed. On the morning of August 7th, the Germans, though not yet masters of the encircling ring of forts, were in possession of the town and citadel of Liege.

If you were to ask me to what the success of this one German column was in greatest measure due, I would say—Ludendorff. Were you to ask me in what way Ludendorff contributed to the success of this column, I would say—by character and leadership.

You may remember that on August 3rd, upon arriving at Aix-la-Chapelle, General von Emmich found General Ludendorff at the Hotel Union. At that time General Ludendorff was Quartermaster General of the Second German Army, having been transferred to that position under mobilization orders, from his position as a brigade commander at Strasburg. From 1913 to 1914 he had commanded the 39th Fusiliers at Dusseldorf. From 1904 to 1913, with only one short interval, he had been in the Operations Department of the General Staff, becoming its chief. His principal work there had been the preparation of strategic plans under the direction of the Chief of Staff, von Schlieffen, and later von Moltke. He was thus acquainted with the plans for the reduction of Liege.

On August 3rd, Ludendorff was acting as the representative with von Emmich's command, of the Commander of the Second German Army, von Bulow, who was at his headquarters at Hanover. In other words, Ludendorff was a liaison officer. His detail as liaison officer with brigades given von Emmich for the operation shows the concern with which von Bulow considered that operation. In fact, the Second German Army was more concerned in the prompt removal of the obstruction to the march caused by Liege, than was the First Army. The Second Army Headquarters had been furnished with information as to the proposed method of execution of the operation; Liege lay squarely in the path of their proposed advance; and General von Emmich was a corps commander in the Second Army. Moreover, in an early order issued by the German high command it was stated: "Should Belgium offer resistance to the advance through its territory, Liege is to be taken by the Second Army, so as to free the main roads which are covered by that fortress." So von Bulow was justified in sending a liaison officer of such high rank to keep him in touch with the operation.

To understand the influence exerted by Ludendorff on the operation it is necessary to follow the movements of the eastern column in its advance into Liege. This column was headed by the 14th Brigade. It started from Micheroux (about two or three kilometers east of the line of forts) about 1:00 A. M. on August 6th. Its route of advance lay north of Fort Fleron, and through the line of forts via Retinne, through Queue du Bois, and so to the heights of La Charreuse on the outskirts of the town. The column was due there early in the morning. The other columns were scheduled to reach the town at the same hour. General von Wussow, the brigade commander, rode with the advance party. General von Emmich with his staff rode almost at the end of the column. Ludendorff accompanied von Emmich.

In the darkness the column stopped. Ludendorff went forward to find out what was the matter. He found that the head of the column had lost touch in

the darkness with the advance party in front. Ludendorff took charge, put the column in march, and remained at the head. There was great trouble in finding the way in the darkness, but at length the column reached Retinne. Ludendorff then led the column off on the wrong road and ran into hostile fire. He was obliged to return to Retinne. Here he placed himself with his men on the right road, and advanced towards Queue du Bois. Von Wussow was missing; his orderly thought he was killed. So Ludendorff *assumed command* of the brigade. He continued to advance. He ran into machine gun fire along the road, and the machine guns had to be captured. He had to engage in house-to-house fighting in Queue du Bois and artillery had to be brought up. The advance was slow, and the soldiers had to be encouraged to go forward. But the village was finally passed, and about 2:00 o'clock in the afternoon the brigade arrived at La Char treuse. Von Emmich came up; confirmed Ludendorff in his assumption of command; and placed reinforcements at his disposal. The night of August 6-7 was spent in great anxiety, but on the 7th the brigade entered the town, headed by von Emmich and Ludendorff. Ludendorff then got von Emmich to relieve him, and returned to Aix-la-Chapelle to report to von Bulow at Hanover what had happened.

Now what are the lessons that this incident teaches?

I think they are that luck is with the man of nerve; that for successful operations leaders of character and determination are often of more value than plans and numbers; that the remark attributed to Marshal Foch that the difficulties of execution are to those of planning as 99 to 1, may be not far wrong.

Here we have a man who had no connection with the operation other than that of observer; who occupied a high position in the German military establishment; whose reputation needed no bolstering up; and who could have been ruined by failure. Yet in an emergency; in the dead of night; during an operation on which grave consequences depended; in the face of hostile fire and reluctance on the part of his own troops; this man had the effrontery and the forceful character to take command on his own responsibility, and push the matter through to a successful conclusion.

Fort Adams, Rhode Island

By CHAPLAIN MYLON D. MERCHANT, U. S. A.

Near the eastern entrance to Narragansett Bay stands one of the oldest and most elaborately constructed forts in the United States. Its massive walls of masonry, with casemate ports for an armament of 500 guns of the type used for coast defenses in 1820-50, attracts the attention of all who enter the eastern passage of the bay.

As early as 1770 the strategic importance of Narragansett Bay was noted and a fort was located on Goat Island as a protection for the town of Newport. This was done by recommendation of the Lord's of Trade of His Britannic Majesty.

On April 29, 1776, the town of Newport unanimously voted to enter into the defense of the town, and three days later, on May 2, a large body of inhabitants repaired to Brenton's Point, the present location of Fort Adams, and there built a fort which commanded the entrance to the harbor. All able-bodied men were ordered to assist in this work under a penalty of "3 shillings a day for each day of neglect." On October 25, 1779, the British, who had occupied the town of Newport and all of the island, burned the barracks at Brenton's Point before evacuating Rhode Island.

After the Revolutionary War the fort at Brenton's Point was unoccupied for military purposes, until, in anticipation of war with France, Congress took measures for the construction of seacoast fortifications to defend Narragansett Bay. In this plan a permanent work was provided for at Brenton's Point, the construction of which was left to Major Louis Tousard. This is described as an "enclosed indented work of masonry for twelve guns, with a brick magazine, soldiers' barracks for one company and officers' quarters." On July 4, 1789, ushered in with a Federal salute of thirteen guns, "the company of John Henry of Artillerists and Engineers, U. S. Army, entered the fort, marching at the head of the column composed of the Major General of the State of Rhode Island and his Military Staff, the Newport Ancient Artillery, the Newport Guards, and a



large concourse of patriotic citizens. The gateway leading to the battery not having been completed, Major Tousard had constructed a temporary arch decked with wreaths of evergreen and over its keystone was a tablet inscribed: 'Fort Adams—The Rock on which the Storm will Beat.' "

The fort was named in honor of President Adams, who approved of the plans for defending our seacoast.

In 1842 a permanent garrison was established and has been maintained ever since. The present reservation consists of a little over 138 acres of land, located on Brenton's Point, about three miles southeast of Newport.

In July, 1812, one month after war was declared against Great Britain, Congress appropriated \$500,000 for the defenses of Narragansett Bay, but little was done except to repair the old forts and earthworks, and to add some more guns. In 1824, after the Board of Engineers had condemned the old Fort Adams as useless, Lieutenant Colonel Joseph G. Totten, of the Corps of Engineers, with an initial appropriation of \$50,000, began the construction of the present old fortifications, which were designed to mount nearly five hundred pieces of various calibers, which would have been amply sufficient against the war vessels of that time.

These elaborate works of masonry, with ditches and sally-ports, under ground magazines, and a subterranean passageway leading from the main fortification for several hundred yards up to Redoubt Hill, where an elaborate redoubt had been built, served as a kind of school of application for most of the young officers of the Corps of Engineers for several years. It was the most elaborate work of its kind in the United States when it was built, and its total cost is unknown. The latest fortifications were commenced in 1896. These are, of course, modern types of casemates for mortars and large and small caliber rifles.

The fort has never been in active fighting except for a few brief hours during the War of 1776, when a British frigate was driven close to it by the guns from Fort Wolcott on Goat Island. When the British occupied Newport all the forts and land batteries had been abandoned because of the uselessness of engaging an overwhelming force.

The field enclosed by the irregular lines of the old fort serves the post as an exceptionally fine athletic field as well as drill ground. It is large enough for "Babe" Ruth drives in baseball, and for a full-sized football field. There are barracks for five regular companies, four in the old garrison and one in the newer brick barracks near the mortar batteries.

Fort Adams is an ideal place to soldier, not only because of the charm of the post itself, but also because of its proximity to Newport, to other larger cities, and to excellent beaches and summer resorts.

Old Fortification Identified

The JOURNAL is in receipt of a letter from Mr. Laurence V. Benét, 22 Rue Caumartin, Paris, the subject matter of which is quoted below. This is not the first time Mr. Benét's name has appeared in the JOURNAL, for a review of its old issues shows that in the JOURNAL of July, 1892, thirty-three years ago, he contributed an article entitled "A Study of the Effects of Smokeless Powder in a 57-mm. Gun." At that time Mr. Benét was Artillery Engineer for the Hotchkiss Ordnance Co., Ltd., of Paris. The letter follows:

"Referring to the reproduction of a photograph facing page 247, of the March issue of the COAST ARTILLERY JOURNAL, this represents the uncompleted stone fortification at Sandy Hook, New Jersey; the low building to the left in the foreground, was the old ordnance machine shop, and the frame building in the right foreground, was occupied by Mr. Sinclair, the Master Mechanic at the Ordnance Proving Ground. The photograph was probably taken between 40 and 45 years ago."

The Latest Word on Antiaircraft Gunnery

A very timely and valuable pamphlet of 154 pages on the subject of gunnery and position finding for antiaircraft artillery, prepared by officers now instructing in the subject at the Coast Artillery School, has just been published.

The book devotes a section each to a brief historical outline of the past development of antiaircraft artillery and to the trend of its development in the future. The remaining thirteen sections present the technical aspects of the subject in a lucid and logical manner. The sixty-one half-tones and diagrams illustrate every instrument and method used in antiaircraft gunnery and both the theory and practical use of all devices are thoroughly and accurately described. The book has been carefully and painstakingly proof-read and it is believed that the minimum of typographical errors has been attained. It is for sale by the COAST ARTILLERY JOURNAL.

A Graphic Method of Fire Adjustment

By 1ST LIEUT. E. G. COWEN, *C. A. C.*

The graphic method of fire adjustment here presented is an application of the bracketing method that eliminates all calculations during firing, shows instantly the corrections to be applied and leaves an easily interpreted, permanently legible record of the conduct of adjustment. While primarily intended for rapid fire at naval targets, it may be used to advantage for land firing.

All possible combinations of "overs", "shorts", and "hits" that can result in the firing of an adjustment series are determined in advance and the corresponding corrections in yards or in units of elevation for the adjustment fork chosen are plotted with their proper signs upon grids as shown in Figures 1 and 2.

To facilitate the construction of these grids the master chart, Figure 3, is provided. This shows in fractions of a fork the corrections to be entered upon various intersections of the grids for four, six and eight shot series.

One grid for each four shots to be fired in improvement fire and fire for effect is the maximum number necessary to prepare when the practice is to conform to the provisions of Coast Artillery Memorandum No. 4 (Revised), January 15, 1923.

The method is clearly illustrated by the graphs of an actual adjustment, Figures 1 and 2.

Each series begins at the upper left corner of a grid. As the sensings are reported successive lines are drawn, one space to the right for an "over", downward for a "short", and diagonally for a "hit". At the end of the last stroke of the pencil appears the correction to be made with its proper direction.

Shots are numbered serially as plotted.

A shot reported as "doubtful" is numbered, but no line is drawn since it has no adjustment value.

Corrections are written as ordered opposite the last shot considered.

When they can be positively identified, shots fired after a correction has been ordered, but before it has been applied at the guns, are plotted and numbered as additional shots in the same series. A new series begins with the first shot fired upon corrected data.

In this instance, Series I consists of four shots falling "short" upon which a correction of +90 yards, or one-half fork, is made. The battery commander, being in a favorable position near the guns, observed that the fifth shot was fired upon old data, hence it is included in the series.

Series II consists of four shots with a correction of +90 yards.

Five "overs" and two "shorts" including the "hit" give a correction of -40 yards on the sixth shot of Series III. The seventh shot is additional.

The graph follows the diagonal so closely in Series IV that a correction is considered unnecessary.

Series V is similar to Series III, the correction being +60 yards.

The correction indicated in Series VI is -30 yards. The correction ordered is -10 yards; an error of +20 yards.

Before the correction called for my four consecutive "overs" in Series VII could be applied, the fifth shot was reported as a "hit". The first four having been reported as "close", no adjustment is made.

Series VIII contains four shots. The second shot being "doubtful" is numbered but not considered for adjustment. The target having been destroyed by the third shot, "cease firing" was ordered. Shot number four, already in the air, completes the series.

Record of Range Adjustment
 Battery "B" 92nd C.A. (PS)
 155mm GPF Guns
 Dec 17 1924

Data	Trial Fire	Shot No	Range
Height of Site	400 ft	1	6020 yds
Range to Target	6000 yds	2	6010 yds
Corrected Range	6051 yds	3	5980 yds
Elevation	104 Mils	4	5990 yds
Sight Setting	3 Mils Left	C.1	6000 yds
Net Correction +51 yds			

Improvement Fire
 Fork = 180 yds

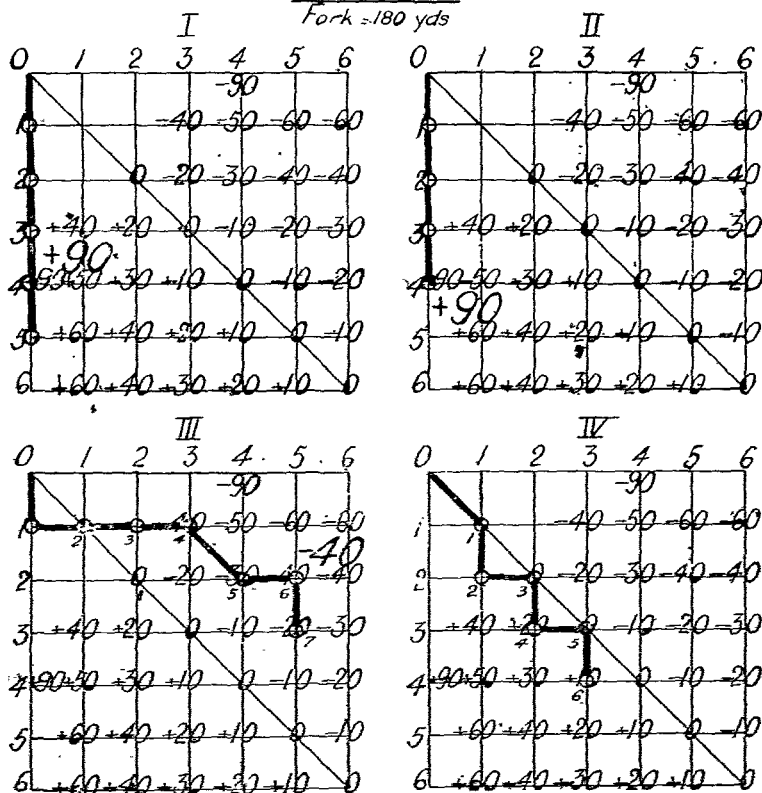
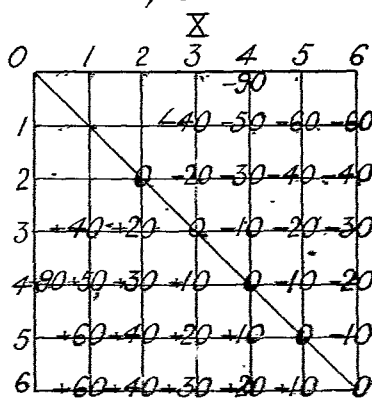
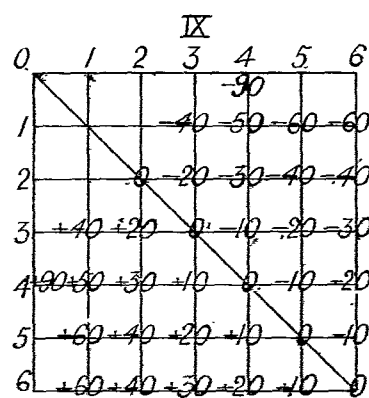
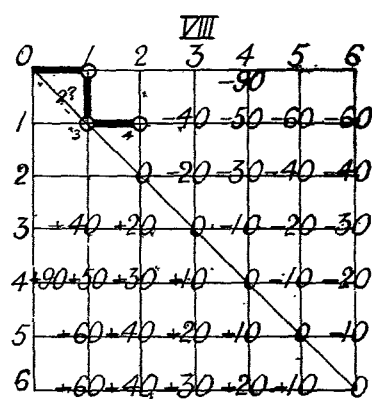
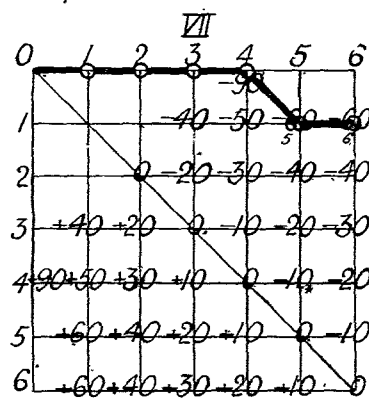
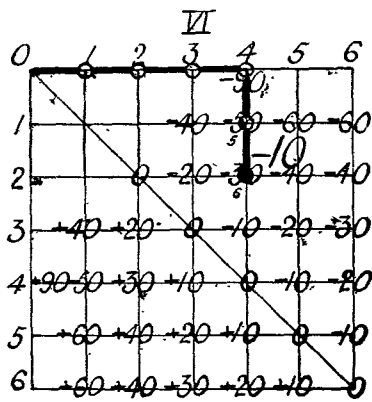
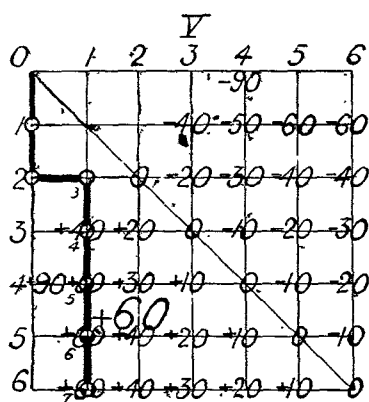


FIG. 1



Page 2

On the grids shown all corrections are written as even multiples of five or ten; the general rule followed being to increase large fractions of the fork and decrease small ones to the nearest even multiple.

In the event that a great range change during firing is anticipated or the range at which fire will be opened is unknown—normal service conditions—grids should be prepared for adjustment forks covering several zones that include all

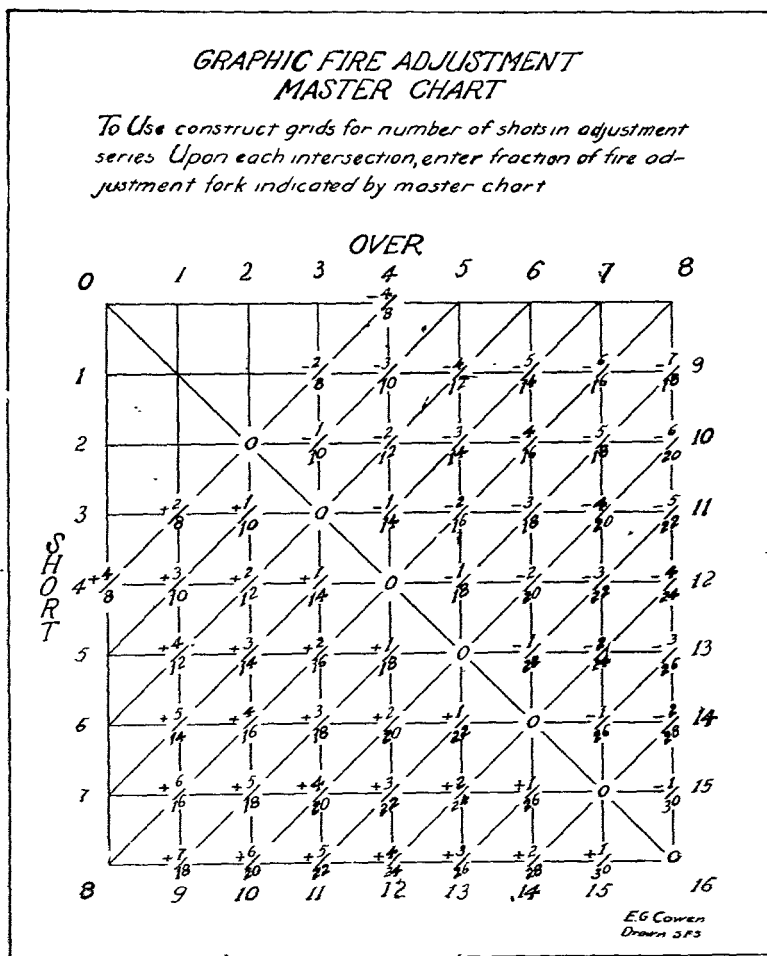


FIG. 3

expected ranges. Fire can then be opened with the proper chart and the change from one fork to another can be made without interruption at the close of any series.

Range adjustment by this method can be safely intrusted to a member of the range section; while the battery commander or the range officer can at a glance check the excellence of the adjustment at any point by noting how closely the graphs follow the zero lines or diagonals of the grids.

Artillery Ordnance Development

EDITOR'S NOTE: *The following notes were compiled in the Office of the Chief of Coast Artillery by Captain Aaron Bradshaw, C. A. C. Credit is accorded the MONTHLY DIGEST OF ACTIVITIES OF THE ORDNANCE DEPARTMENT, for much of the information contained herein.*

STATUS OF HEAVY MOBILE ARTILLERY.—The missions of the heavy artillery are special, such as counter-battery, interdiction, and destruction mainly at long ranges which fall beyond the activities or capabilities of the medium (corps) artillery.

It is a part of the G. H. Q. Reserve artillery, which was organized during the World War as Army Artillery. There is also in the G. H. Q. Reserve additional light and medium artillery as well as special purpose material, such as pack artillery, trench artillery, railway guns, super guns and howitzers, and anti-aircraft artillery. These materials are ordinarily classed under their particular type, such as light, pack, etc., and will not be discussed here.

Previous to the World War there was no heavy mobile artillery in our service, such as the heavy artillery of the Army used during the war. The requirements for heavy mobile artillery during the war led to the adoption of types listed below:

	<i>Elevation Degrees</i>	<i>Traverse Degrees</i>	<i>Range Yards</i>	<i>Wt. in firing position, lbs.</i>
GUNS				
6-inch Gun, Mk. VIIIA, British	38	8	19650	22512
155-mm. G. P. F. Gun, M. 1918	35	60	17160	25960
HOWITZERS				
8-inch Howitzer, Mk. VII	50	8	10760	20050
9.2-inch Howitzer, Mk. II	50	60	10060	35500
240-mm. Howitzer, M. 1918 (Schneider).....	60	20	14280	41296

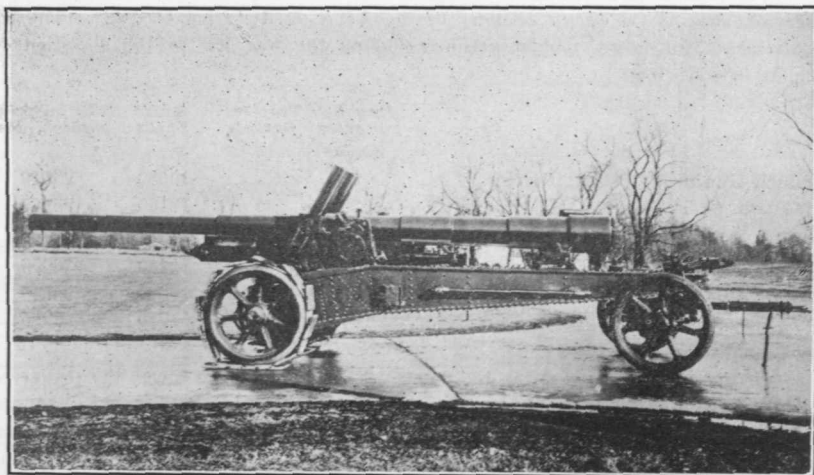
Of the guns mentioned the 155-mm. G. P. F. gun, M. 1918, was the preferred type used in our service. This unit was regarded as very satisfactory, except for its range, which is somewhat shorter than that desired for heavy artillery. The carriage is of the split trail type providing a wide field of fire without shifting the carriage. In order to change from the traveling to the firing position, it is necessary to jack up the carriage and secure the axle to the bottom carriage by a pin in order to remove the load from the spring. Separate jacks and a lifting beam are also required to lift the carriage in rear so that the trails may be swung out to their position and attached to the spades which are already approximately in place. The recoil mechanism is of the hydro-pneumatic type with a variable length of recoil. In transporting the unit the gun is retracted to a traveling position, so as to equalize the load on the wheels, and the unit remains a single four-wheel load.

The 6-inch gun is mounted on the same carriage as the 8-inch howitzer. The units available were considered best for use as howitzer materials, however, so that very few of the 6-inch guns were used.

As a result of the experience gained in the World War, it was decided that a type of heavy field gun and a type of heavy field howitzer are necessary for the armament of the field army. The gun should have a range of about 25,000 yards and the howitzer a range of about 18,000 yards and both to have a wide field of fire. These pieces which are more powerful than the medium artillery, add range for interdiction and harassing, and to the counter-battery and destructive effect of the medium (corps) artillery.

The calibers chosen for future development were 155-mm. for the gun and 8-inch for the howitzer. The 155-mm. projectile is sufficiently heavy for the harassing and interdiction fire which is the principal mission of the heavy gun. This caliber gave general satisfaction during the war, and was used by the principal nations engaged in the war. The caliber of 8-inch for the howitzer was chosen as giving the greatest power that could be obtained in a howitzer and yet have the mobility of the 155-mm. gun.

A still heavier type of howitzer and a larger gun having the maximum power consistent with the necessary mobility to accompany an army in the field are considered necessary also, but no work has been done on those, due to lack of funds. The 240-mm. howitzer is regarded as a satisfactory caliber for such a howitzer, the range to be greater than 16,000 yards, preferably near 25,000 yards. An 8-inch gun is regarded as satisfactory for the gun to have a range of 35,000 yards.

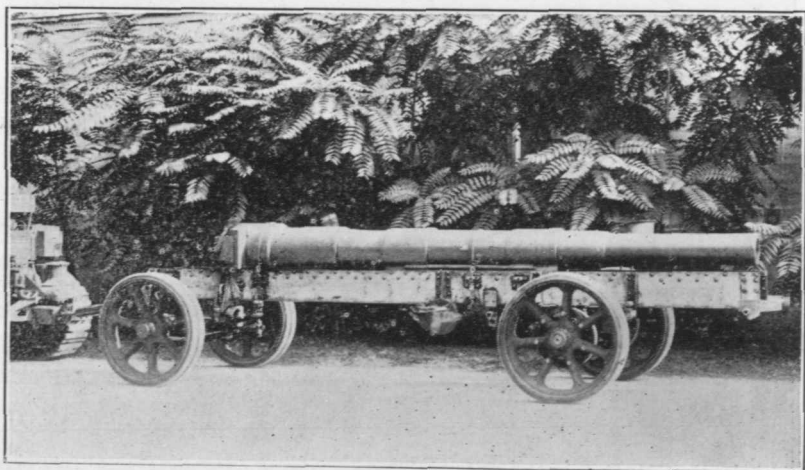


155-MM. GUN, MODEL 1920-E IN TRAVELING POSITION ON AN 8-INCH HOWITZER-155-MM. GUN CARRIAGE, MODEL 1920-E

MODEL OF 1920 MATERIAL.—To meet the requirements for the normal heavy (army) gun and howitzer the 155-mm. gun-8-inch howitzer material, model of 1920 was designed, and one field carriage and one self-propelled unit built for test. The piston rod pull for the howitzer is nearly the same as that for the gun, so that no major compromises were necessary to mount the howitzer and the gun on the same carriage. The carriage is of the split trail type generally similar to the 155-mm. G. P. F. used during the war. The materiel in firing position weighs 23,590 pounds. The gun has a range of 25,860 yards, using a 95-pound projectile with a muzzle velocity of 2800 f.s. The howitzer has a range of 18,700 yards, using a 200-pound projectile with a muzzle velocity of 1950 f.s. The normal charge with a velocity of 2100 f.s. for the gun at 45 degrees elevation gives a range of 20,000 yards. This range is obtained with the supercharge (muzzle velocity 2800 f.s.) when firing at 20 degrees elevation. The powder charge for the howitzer is zoned so as to get plunging fire at all ranges up to the maximum. The recoil mechanism has a variable length of recoil in order to avoid digging more of a firing pit than necessary. The recoil mechanism is adjusted at an

arsenal for either the gun or howitzer, and is issued for use only with the cannon for which adjusted. So as to further reduce the depth of pit required, the trunnions are located near the breech. The tipping parts are not balanced about the trunnions then, and a counterpoise is required in order that the piece may be easily elevated and depressed. The lower ends of the two equilibrators rest in brackets on the top carriage and work against arms on the trunnions. The handwheel loads for elevating vary from 2 pounds to 20 pounds, as compared with the handwheel load of 7 pounds required to traverse the piece.

A quick turn mechanism is provided to return the gun to horizontal for loading. This mechanism is independent of the elevating mechanism so that the laying of the gunner is not disturbed by loading. Jacks are included in the mounting of the axle so that the weight can be taken from the springs and the axle connected directly to the bottom carriage without the use of separate jacks. The method of supporting the trails when going into firing position by the use



HEAVY TRANSPORT WAGON

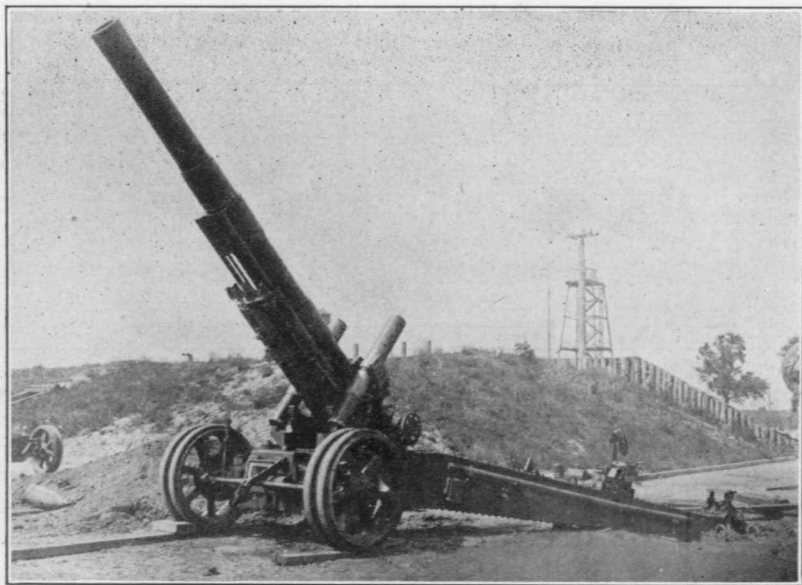
of a lifting beam and jacks under the rear edge of the bottom carriage, similar to that used with the 155-mm. G. P. F., has proved to be the most practicable in Ordnance Department tests. As the steel spades provided with the carriage weigh 790 pounds each, and are not easily handled by hand, a crane carrying a chain block has been mounted on a ten-ton tractor to facilitate their handling. This crane has also been successfully used to swing the trails out to the firing position. One experimental wood spade with metal trail fastenings has been provided in an effort to develop lighter spades and which may more readily be carried on the carriage.

The gun or howitzer may be transported on the carriage in a retracted position. As the total weight, 28,000 pounds, in this position is too great for handling, a division into two loads is more desirable, and the Heavy Transport Wagon is provided to carry either the gun or the howitzer. The wagon is provided with winches for raising the trails underneath the wagon, so as to align the body with the guides of the recoil mechanism and for the retracting of the cannon. As it was found difficult to align the body and the guides by this method alone, the front traveling lock was made adjustable. This adjustment is sufficient

to permit the guides of the recoil mechanism to be aligned with the guides on the wagon body and to prevent binding as the center of gravity of the gun moves onto the wagon.

The tests of this material made by the Ordnance Department have shown it to be generally satisfactory for a weapon of this type.

TARGET RIFLES.—The War Department has been asked to approve the issue, at the option of organization commanders, of three U. S. rifles, caliber .30, model of 1903, special target, to each company of Infantry and similar organizations armed with the rifle, to be used by candidates for rifle teams, but not for annual target practice to qualify for increased pay. These "special target" rifles are the used National Match rifles that are returned to Springfield Armory



8-INCH HOWITZER, MOUNTED ON COMBINATION GUN-HOWITZER CARRIAGE

each year at the conclusion of the National Matches and there cleaned and repaired. They are excellent target weapons.

MACHINE GUNS AND AUTOMATIC RIFLES.—The self-luminous sights, Marks II and III, and the front area anti-aircraft sight for the Browning automatic rifle have been declared obsolete. A shoulder stock is being provided for anti-aircraft machine guns. Base plates will be added to the experimental caliber .50 anti-aircraft tripods to give better stability. A caliber .30 and caliber .50 anti-aircraft tripod is under construction. This mount is designed to mount either the caliber .50 or caliber .30 Browning machine gun for anti-aircraft purposes. Several new features have been added to this mount to give better stability and ease of control by the gunner. It is expected to deliver at least eighteen of these new mounts to the service prior to May 1, 1925. Eighteen anti-aircraft sound detectors of the exponential horn type are to be built and should be delivered to the service in the near future. Although the recent tests of Caliber .50 tracer cartridges by the Coast Artillery Corps indicated that the caliber .50 red tracer was

very promising in so far as brilliancy is concerned, in view of the slightly large percentage of blinks, short traces, etc., that developed during the tests, experiments are being continued with a view of eliminating this defect. In this connection, several flat base tracer bullets, in which the container cup is omitted, have been made up at Frankford Arsenal and submitted to Aberdeen Proving Ground for firing tests.

Third Annual Antiaircraft Day

The Third Annual Antiaircraft Day was held at Fort Totten, New York on May 2nd. The day was cool and dry, and the resulting attendance of about 3000 was up to expectations.

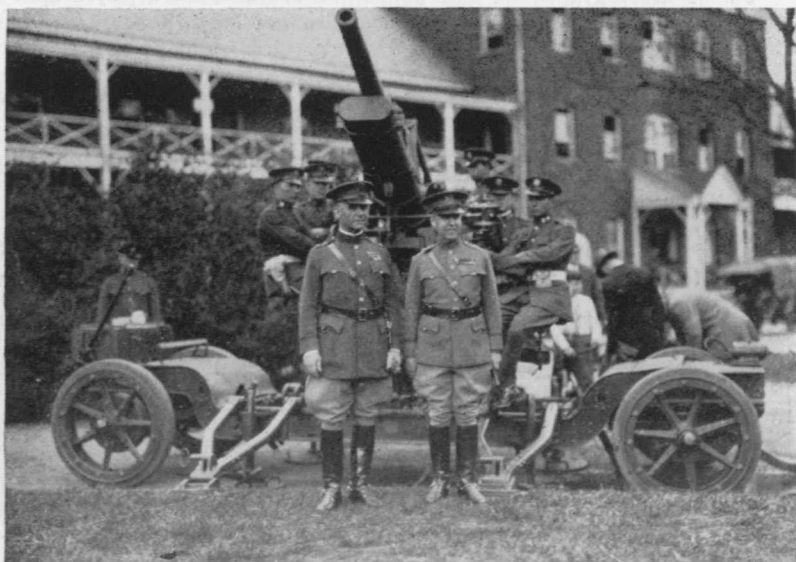


Photo by Signal Corps, U. S. Army

MAJOR GENERAL CHARLES P. SUMMERALL, COMMANDING THE 2ND CORPS AREA, AND BRIGADIER GENERAL JOHNSON HAGOOD, COMMANDING THE 2ND COAST ARTILLERY DISTRICT

The day opened with an address by Brigadier General Johnson Hagood the District Commander, who welcomed the members of the command which consists of the following regiments: 7th and 62nd, regulars; the 198th Delaware, 212th New York, 244th New York, 245th New York, National Guard; and the following Reserve organizations: 502nd, 533rd, 521st, 522nd, 513th, 514th, 530th, 539th, 602nd, 607th, 619th, 620th and 621st. All regiments were represented by colonels or field officers.

General Hagood concluded his address of welcome by introducing General Summerall, who declared his confidence in the antiaircraft artillery, and voiced his approbation of occasions such as this one for the promotion of better personal acquaintance and better understanding between the several army posts and between the several branches and components of the Army of the United States, Regular Army, National Guard and Organized Reserves. He expressed confidence in antiaircraft artillery and impressed upon the regiment the importance of

getting hits in their coming target practice season. He stated that he expected them not only to hit the theoretical target representing a plane, but to hit the small towed sleeve target which marked the center of the theoretical target. He said that every hit on this small target would be represented by an "A" painted on the gun, and at the end of the season he expected to see every gun with a number of "A's" thereon.

After a talk on recent developments in antiaircraft artillery, by Captain D. D. Hinman, C. A. C., the 62nd Coast Artillery (Antiaircraft), Colonel Marcellus G. Spinks, Commanding, was reviewed by General Hagood, who invited to accompany him Generals William S. Graves, Preston Brown, Howard S. Borden, S. H. Wolfe and the Colonels commanding regiments of the National Guard and the Organized Reserves.

For the demonstration, the 62nd approached in trucks and deployed upon the parade ground. The firing of blank ammunition at three airplanes in formation

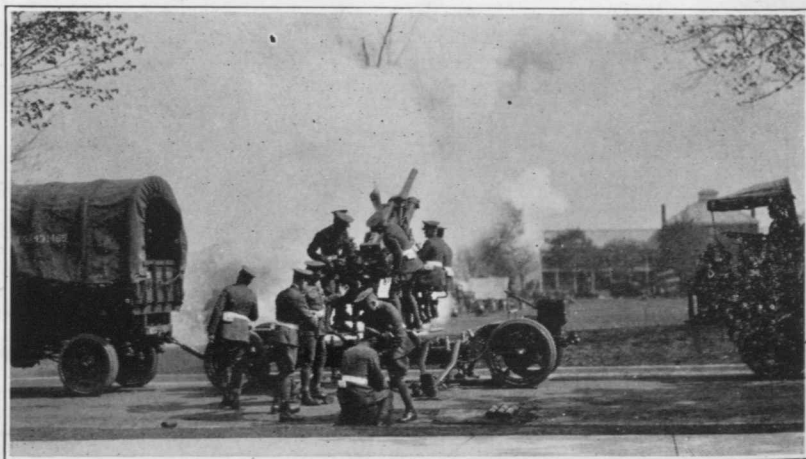


Photo by Signal Corps, U. S. Army

from Mitchell Field was so realistic that a number of the ladies eagerly sought information as to the number of hits obtained. Many of the crowd surged excitedly toward one of the guns when the ambulance charged across the parade and evacuated a casualty (?).

An interesting and interested detachment of observers was about fifty of the Knickerbocker Grays, boys of about ten to thirteen years of age, who were smartly turned out in gray uniforms similar to those of the Seventh Regiment of New York.

General and Mrs. Hagood had about sixty guests for an informal buffet supper at the commanding general's quarters; and the officers of the post about 500 at the Club. All of the regular army garrisons in and about New York City were represented by officers and their families. A large number of Coast Artillery officers of the National Guard and Organized Reserves took the convenient opportunity to bring guests interested in military affairs.

This was the third annual antiaircraft day. Since the first, the affair has become more widely known and has received increasing interest and attendance. It is rapidly becoming one of the prominent military events of the year in the metropolitan area.

Where Do We Stand in the Air?

EDITOR'S NOTE: Theodore Roosevelt, former Assistant Secretary of the Navy, recently wrote on this subject in the Liberty Weekly. In view of the fact that his utterances are always given wide publicity, and that he is everywhere recognized as a patriotic American intensely interested in a suitable defense for this country, his views on the present day discussion should be of particular interest. Following are certain extracts from the article.

The development of our air service, both from the standpoint of defense and from the standpoint of its commercial value, is of great importance. We must give it every support. On the other hand, just because it is new and picturesque, we must not be carried away and do things which will injure the defense of the country, and for which we will be sorry later—possibly when it is too late.

The airplane has not eliminated either the Army or the Navy. It is not a separate service, but an integral part of both the Army and the Navy, and a united air service would damage, not help, our power to protect ourselves.

At this time there are many who are suggesting that we abandon the method we now have of an air service belonging to and developed by the Army and Navy, respectively, and combine our governmental air work under a separate head independent of these services. This, I believe, would be a great mistake.

In my opinion our ability to defend ourselves would be damaged by a united air service. Primarily, the air service is an auxiliary arm. It functions as a part of either the naval or military machine. You do not think of airplanes fighting a battle to determine the course of a war independent of either the Army or Navy.

The principal service the air forces perform in war—and they are most important—are, first, information, and, second, harassing. Under harassing I include the destruction of material—such as ships or munition plants. Both of these functions are performed in connection with either Army or Navy. It is axiomatic that the only way to get the highest efficiency in combat is to train together in times of peace. The arms that either the general or admiral employs should be part of his machine, and they can only be so if in time of peace they belong to the services.

Besides this, the work of air forces with the Army and Navy is very different. It is one thing to operate from an airplane carrier or a battleship, or from the water, and another to operate from land. The "spotting" of shell fire is different for battleships and troops. A naval aviator must know the science of navigation. It is not necessary for an army man to know this.

We now have no less than three boards connecting in various ways the two services. They are as follows:

The Joint Board of the Army and Navy, which is composed of ranking officers of both services and which considers all problems affecting the relationship of the two services.

The Aeronautical Board, composed of two officers from the Army Air Service and one from the General Staff and two from the Navy Bureau of Aeronautics and one from the office of the Chief of Naval Operations. This board has as its sole function the coordination in all ways of the aeronautical activities of the sister services.

The National Advisory Committee for Aeronautics, which is independent of the departments and is responsible to the President alone. This has as members civilians as well as officers. Its mission is the scientific study of the problems of flight.

These boards have for one of their main objectives the cooperation of which I have spoken. I believe such cooperation can be still further developed. I believe that at times in both services there is too great a feeling of rivalry and not enough understanding of their mutual interests.

I believe, however, that day by day this is being eliminated and that once both services get thoroughly indoctrinated with the idea of cooperation great strides will be made. When this takes place the costs of separate air services will differ little, if any, from the cost of a combined service.

It is urged that sinking of certain old warships by airplane bombing proves that the battleship is useless. The bombing of these old war vessels was nothing but target practice. Vessels moored at a given place are one thing, vessels cruising in unknown waters are another. Furthermore, it is one thing to bomb a ship that is helpless and another to bomb a ship that can fight back.

I have seen hostile aircraft operate where there were no antiaircraft guns and where we had but few planes to oppose them. There is all the difference in the world between what they do under these circumstances and what they do when they meet a stubborn defense.

To sum up, the development of the air service, both from the standpoint of defense and from the standpoint of its civilian uses, is of great importance to this country. I hope that we will not only maintain but increase the governmental appropriations therefor.

Our civilian development at this period must come largely through governmental aid and initiative.

The air mail service should be continued and expanded. However, we must not let our enthusiasm for the new and picturesque sweep us from our moorings.

A united air service would be dangerous and ineffective. The Army and Navy are the backbone of the defense of the nation. Their maintenance must be our constant care.

Naval Antiaircraft Gunnery

That the Navy has been conducting a systematic antiaircraft target practice, and that it is effective, is the statement which Secretary of the Navy Wilbur made in connection with the data for the year 1924 and 1925, which was given out at the Department on April 20. It is estimated by the Secretary that if the sleeves, which were the targets, were as large as bombing planes, that there would have been 95 per cent hits.

In this connection, it is explained that by hits it is meant that one or more shots in an attack by an airplane reaches its mark. No statement is made of the number of shots that are fired at any of the approaches. The altitude of the targets, it is stated, was from 4000 to 5000 feet, this being as high as the sleeves could be towed by the machines which were used for this purpose. The sleeves were actually shot down on two battleship practices and on one light cruiser practice.

The following is the table, giving the details of the reports from the Fleet. It should be borne in mind, the Secretary states, that a sleeve is 1-11th the size of a bombing plane.

Number of ships reported: Battleships, 16; light cruisers, 2; total, 18. Number of practices reported: Battleships, 36; light cruisers, 6; total, 42. Number of guns firing in salvo: Battleships, 4; light cruisers, 2; total 6. Number of practices on which towed sleeve was hit: Battleships, 17; light cruisers, 3; total, 20. Per cent of targets hit: Battleships, 47 per cent; light cruisers, 50 per cent; total, 46 per cent.

* * * * *

Announcement was made at the Navy Department on April 23 that the new 5-inch antiaircraft guns will be installed on the battleship *Maryland* during her overhaul period this summer. The effective range of this gun, it is stated, is 8000 yards. This type of gun will replace the 3-inch antiaircraft guns on the fleet.

The new type is not only larger but is equipped with an improved fire control and will throw a new type of high-explosive shell. Successful experiments have also been made with highly sensitized shells, which, it is claimed, will explode with even the touch of a wing of an airplane. The mountings make the gun more flexible and make it possible to fire vertically as well as at any angle or any direction.—*Army and Navy Journal*.

Of Interest to Those Who Have Recently Served in Washington

Under a certain decree of the Supreme Court of the District of Columbia, the Potomac Electric Power Company of Washington, D. C., has been directed to refund, to rate payers, in the District of Columbia, twenty per cent of the total amount of bills paid for electric current during the whole or any part of the period from August 1, 1917 to December 31, 1924. Those interested may secure application blanks for refund by direct application to the company.

The value of military training in its broadest sense neither begins nor ends with the physical, as it includes much more than sufficient exercise, proper eating, and regulated hours. Its effects upon character are much more important, although difficult to catalogue or define. Self-discipline and self-control are its products and deserve the highest ratings. The object of all military training, as far as the individual is concerned, is to give him that strength of character and purpose, that power over his own emotions and actions, that will result in his being normal under the most abnormal of conditions, calm during the most exciting of events, attentive to duty under the most distracting of circumstances, and determined to perform the tasks assigned to him in spite of all handicaps, against opposition aimed at his destruction. That is not only the aim, but the accomplishment of military training. Such training certainly should give the same individual the proper mental attitude for meeting the normal problems of a normal peace life without fear or tension and with that easy confidence so necessary for success.—*Secretary of War John W. Weeks.*

MILITARY NOTES

furnished by

THE MILITARY INTELLIGENCE DIVISION, G. S.

Chile

ARMY RETIREMENT LAW: In February of this year a new law was passed governing retirement of the commissioned, enlisted and civil personnel of the Chilean Army. A few of its interesting provisions follow.

Retirement is compulsory for all officers completing forty years of service and for line and staff officers who reach the following ages in their respective grades:

Lieutenants	34 years
Captains	44 years
Majors	49 years
Lieutenant Colonels	53 years
Colonels	56 years
Generals of Brigades	58 years
Generals of Divisions	60 years

The President may grant permanent retirement to officers of 25 or more years of active service. Officers of 30 or more years service will be granted retirement upon request.

To be eligible for retired pay, an officer must have had at least 10 years of active service as an officer.

Retired pay is based upon active pay according to length of service, as follows:

<i>Years of Service</i>	<i>Per Cent of Pay on Retirement</i>
10	25
15	41
20	56
25	71
28	80
30	86
33	95
35	100

Officers partially disabled in line of duty or during campaign will receive credit for an additional ten years of service in computing their retired pay. Officers totally disabled under the same circumstances will receive retired pay equal to their entire active pay, and, if they have fulfilled the requirements for promotion, they will receive retired pay equal to the active pay of the next higher grade.

France

THE FRENCH COLONIAL ARMY—The French speak of the Metropolitan Army (*Armée Métropolitaine*) to distinguish it from the Colonial Army. The term Metropolitan Army applies to that part of the French Army which is composed of men furnished by the operation of the conscription law in what is called "France" as distinguished from the colonies of France. Algeria, in this as in most other respects, is, from the point of view of law, a part of France and is not a French colony. Algeria is politically a department of France and sends deputies to the French Chamber. It is true there is a Governor General, but for all practical purposes Algeria is a part of France. The conscription laws thus apply equally to Algeria and Continental France. Algerians, as a rule, serve their legal term of service as part of the 19th Army Corps which is the Algerian Corps Region.

Outside of this Metropolitan Army there are two organizations having their own distinct autonomy; these are the Foreign Legion and the Colonial Army. The Foreign Legion is now made up of four regiments of infantry and one of cavalry; in time of peace they are habitually located in the colonies; in time of war or for any expedition, the whole or part of the Legion is sent wherever required.

The word "Foreign Legion" has been employed for a century to designate a body of troops of the French Army composed largely of foreigners, but commanded by French officers. This term is still used in common parlance, but officially these troops are known as "Foreign Regiments" (*Régiments étrangers*). The creation of these troops was authorized by a law approved March 9, 1831, and various orders as to the formation, organization and recruiting of these regiments have succeeded each other since that date.

For a foreigner to be accepted in the Foreign Legion, he must be at least 18 years old and not more than 40; he is required to produce a certificate of birth or some other equivalent paper, a certificate of "respectability" and a certificate from the military authorities establishing that the man has the qualities necessary to render good military service.

Men of French birth may also enlist in the Foreign Legion on their request properly approved. These may be men who have not yet performed their military service or others who wish to reenlist after their military service.

The period of enlistment is for five years; reenlistments in the Legion may be made for periods varying from two to five years. Foreign officers who wish to serve in the Foreign Legion may be permitted to do so under certain conditions, amongst others, they must do a preparatory tour of six months before being accepted.

Troops of the Foreign Legion in time of peace invariably are stationed outside of Continental France. When first organized in 1831, the Legion was intended solely for service in Algeria; since that time parts of it have received other assignment in French Colonies, usually to territories going through a period of pacification. At present these troops are located in Morocco, Algeria, Tunisia, Syria, and Indo-China. It is prescribed that these troops may be joined to those of the Colonial Army and receive the same advantages and distinctions as the Colonial troops.

The Colonial Army is recruited and administered under the provisions of a law approved July 7, 1900, which created it mostly from existing elements. These were formerly known as "Marine Infantry" and "Marine Artillery" and were

under the orders of the Navy Department. Colonial troops are now under the Minister of War. They comprise the following:

a. French elements. Composed of Frenchmen who volunteer for service in the Colonial Army, or men forming part of the annual French contingent and who have agreed to serve in the colonies. The volunteers of both these categories are given certain advantages, such as civil employments reserved for them after 15 years of colonial service, farm lands in the colonies, etc.

b. Colonial elements. Composed of men recruited in various colonies through the application of special laws and decrees applicable to each one of these colonies.

c. Native troops. Recruited by volunteer enlistments in certain colonies or protectorates and formed into special organizations, such as Moroccan Sharp Shooters, Senegalese Riflemen, etc.

The law permits Colonial troops to be garrisoned in any part of the territory of France or of her dependencies. Some of the organizations of the Colonial troops are always stationed in France where they have a number of depots. Native Frenchmen who volunteer for the Colonial Army are never sent to the colonies before they are 21 years old or before they have served for six months.

Colonial troops are primarily intended to garrison and defend French colonies and protectorates. They may, in case of need, be called to Metropolitan France for service, or they may take part in expeditions outside of French territory. During the late war large numbers of Colonial troops served at the front, and some of these divisions, e. g., the Moroccans, were considered amongst the very best in the Army.

Colonial troops always preserve their autonomy and remain under the orders of officers of the Colonial Army. They are entirely distinct from the troops of the Metropolitan Army. They have their own regime and a budget which is distinct from the appropriations for other troops. There is at the Ministry of War what is called a "Direction" charged with everything which concerns the personnel, instruction and command of the whole body of Colonial troops. At the head of this Direction or, as we would say, Bureau or Department, there is a general officer.

In each colony the governor has under his authority the officer commanding the (colonial) troops, and this officer is responsible to the governor for the preparation and conduct of military operations and everything relating to the defense of the colony. There are a certain number of major generals and brigadier generals of colonial troops amongst whom the Minister of War selects those for the command of divisions, brigades, etc., in France and in the colonies; however, in what concerns the latter he must first consult the Minister of Colonies.

General officers of the Metropolitan Army, in exceptional cases and on account of former service in Algeria, Tunisia or the colonies, may be given employment in the Colonial Army, but this only with the consent of the Minister of Colonies. However, no more than one-fourth of the number of general officers allowed by law to the Colonial Army can be thus selected. Exchange amongst officers of the Colonial troops and those of the Metropolitan Army may be effected according to rules which are established governing such permutations.

The Colonial Army has long had its own distinct uniform of khaki.

The Colonial Army at present consists of 40 regiments and 19 independent battalions of infantry and nine battalions of machine guns of four companies each, stationed in various parts of French territory.

Germany

EVOLUTION OF GERMAN INFANTRY IN 1924—Due to the fact that several of the higher officers of the Infantry School at Munich took part in Ludendorff's putsch in November, 1923, the school was closed. In the month of March, 1924, the course was started again, not in a city, but in the army camps southwest of Erfurt. Reichsrat in December, 1924, definitely authorized its transfer to the city of Dresden.

ARMAMENT—The rear sight of the rifle which was graduated from 400 to 2000 meters, has been graduated from 100 to 2000 meters. This appears to indicate that the Germans consider more and more the rifle as an arm of close combat, the fire at long distances (above 800 meters) is normally executed by the heavy machine guns, the fire at middle distances (800 to 400 meters) by the light machine guns and telescopic rifles. Below 400 meters individual fire becomes important, to complete, according to the expression of General von Taysen, Chief of Infantry, the "great preliminary work of the automatic arms."

The regiments of infantry are assigned infantry guns. In order not to transgress the military clauses of the Versailles Treaty, the barrel of the piece is of wood, but it is furnished with sighting facilities necessary to give instruction to the officers and men. These Quaker guns were used during the last autumn maneuvers.

Improvements on the Stokes mortars are in course of study or execution. Especial studies are being made on loading from the breech. They have commenced supplying the mortars of medium caliber with circular base plates which permit them to fire in all directions and to change the objective rapidly.

INSTRUCTION—The instruction appears to be particularly directed with a view to develop especially the mobility of the infantry, the complete utilization of its many auxiliary means of fire, and the efficacy of the measures of defense against airplanes.

With regard to the mobility of the infantry, the 1st Division, during the fall maneuvers, was exercised in the crossing of rivers. It has been stated that the recent accident which resulted in the drowning of a company of infantry was caused while training in a new system of rapid massed movement over the pontoons in an attempt to hasten the crossing and thus decrease the time under fire.

In addition, a type of raid has been organized which contemplates a journey of 45 kilometers per day for two or three days by a *Wanderpatrouillen*, small detachments of a dozen men conducted generally by two officers.

As regards the training in complete utilization of infantry auxiliary weapons, the use of indirect fire by heavy machine guns is practiced. Direct fire, the normal employment, is not abandoned. The idea is to have as great a concentration of fire as possible by using in indirect fire those machine guns which, due to distance or terrain, cannot join in the direct fire.

The infantry must fight now in "the three dimensions of space," according to the expression of a German military writer. The fight against the enemy airplanes is among the most important of its missions. The principal measures employed by the infantry in its defense against airplanes consist of marches by night—breaking up columns—a system of scouts for airplanes provided with means of communications and marching either in advance or on the flank of the marching columns—finally, the constant employment of heavy machine gun fire against airplanes (up to 1000 meters in altitude) and light machine guns (up to 600 meters).

Italy

COAST DEFENSE TROOPS—Seacoast defense is provided for in several different ways by different nations. In Japan, Great Britain and Italy, the army is charged with the operation of the coast defenses, while in France coast defense control is under the Naval Ministry, which, for this purpose, disposes of elements belonging to the War Ministry.

In Italy, fixed defense troops are part of the army and are called coast artillery (*Artiglieria da costa*) and heavy artillery (*Artiglieria pesante*).

These two organizations are not considered as a separate branch, but form part of the Italian artillery which is composed of field, heavy field, mountain, coast and heavy, and antiaircraft artillery. A general officer acts as chief of all artillery.

Officers of artillery theoretically are trained for service with any of the above groups; in practice, officers are permitted to specialize for service with that type of artillery which they prefer and for which they are best qualified.

Japan

CONSTRUCTION OF CRUISERS IN JAPAN—According to the Teikoku News Agency, by the end of the year 1928, eight cruisers, each of over 7000 tons gross, will have been constructed for the Imperial Navy at the estimated cost of 391,000,000 yen.

The work was taken in hand last summer and of the eight vessels, the *Kako* and the *Furutaka*, each of 7100 tons, will be launched, the former at Kawasaki and the latter at Nagasaki. The keels were recently laid of two other vessels, the *Myoko* and the *Nachi*, each of 10,000 tons, the former at the Yokosuka Naval Arsenal and the latter at the Kure Naval Arsenal. The *Kinugasa* and *Aoba*, each of 7100 tons, will be started early this spring, while two other cruisers, the *Ashigara* and the *Haguro*, will be built as soon as the above vessels are completed.

AIR SERVICE TO BE AN INDEPENDENT COMBAT ARM—It is reliably reported that the Japanese Army Air troops are to be organized into a distinct combat arm on the same footing as infantry, cavalry and artillery. The Japanese Air units were originally organized under the engineers and to date the officers are detailed from all branches of the army. In most cases, the officers, after completing a detail, have returned to their original arm, leaving only a few old, thoroughly trained officers with the air service.

EXPLOSION OF JAPANESE AIRSHIP CAUSED BY RADIO WAVES—It is announced in Japan that after a whole year's investigation and experiment it was discovered that the explosion of the S. S. No. 3 Airship, attached to the Kasumigaura Air Force on March 19th, last year, which caused several of the crew to lose their lives, was due to radio waves.

Dr. T. Terada, professor in the College of Science of the Tokyo Imperial University, carried out extensive experiments in the University laboratory.

A miniature airship was brought over the experimental table and radio waves were broadcast to it. Against the metallic paint of the airship the sparks produced a length of $\frac{3}{8}$ inches. The enigma of the explosion was declared due to this cause.

Switzerland

INVENTION FOR PRESERVING FRESHLY BAKED BREAD—It is reported that Mr. Jean Matti, a baker, residing at Pully near Lausanne, Canton de Vaud, has discovered a method of preserving freshly baked bread. This discovery is the result of ten years of research work which Mr. Matti has perseveringly conducted in the face of disappointing and costly experiments.

On December 4, 1924, Professor Charles Arragon, Cantonal Chemist of the Canton of Vaud, was able to issue officially the following declaration regarding this discovery:

"The undersigned, Chief of the State Laboratory of the Pure Food Department and Director of the Chemical Analyzing and Bacteriological Laboratory of Pure Food of the University of Lausanne, certify that the bread prepared by Matti's system (deposited trade-mark Mattipan) has been perfectly preserved during a period equalling ten months. The length of time may be guaranteed for two years at the minimum, the experiments having been done at a constant temperature of 40° C."

By reason of the utilitarian nature of this invention, which may render great services to armies, navies, and colonies, the local press has not failed to bring it to the attention of the public, and numerous interested inquiries from financiers have been made to Mr. Matti's legal agent. It would appear that all kinds of flour may be used to make "Mattipan" bread, of which the Swiss and international trade-mark have been deposited at the Federal Bureau. The quantitative output is the same as for ordinary bread. The raw material which enters into the composition of the product is very small and can be found anywhere and requires an increased cost of only 1 Swiss francs (77 cents at the actual rate of exchange of 5.18 francs for one dollar) per 100 kilos of flour (220 pounds).

The Department of the Interior of the Canton of Vaud has officially declared that "Mattipan" meets the requirements of the law on alimentary pure food and that its consumption is in no way harmful. The taste of "Mattipan" is that of ordinary bread while, as regards its nutritive qualities, 115 kilos are reported to equal 140 kilos of ordinary bread. Chemists, who have been consulted, report that Mattipan is also superior, both in composition and making, to ordinary bread from a hygienic point of view, especially since elements of fermentation, insects and rodents as well as cryptogamic illnesses, may be completely eliminated. Experiments have been conducted in an atmosphere of 40° centigrade, as below freezing point, and in ammonia, and, after periods of three months, "Mattipan" subjected to the three tests was in perfect order. The result was obtained, it is claimed, without any special oven or cooking method, and all ordinary kinds of yeast can be used. The Swiss military authorities have agreed, it is learned, to replace the biscuit, which is the present ration in use in the Confederation, costing 37 centimes (7 cents) by "Mattipan," which can be made at a cost of 23 centimes (4.4 cents).

In countries which do not have to import as Switzerland does, the cost of manufacture would be at a still lower price.

Mr. Matti is now studying the preserving of pastry and has conducted successful experiments along the line of preserving bread containing meat, such as sandwiches.

THE NEW AUTOMATIC RIFLE—The following description of the Swiss new automatic rifle is taken from "L'Alsace Francais" of March 7, 1925:

The Swiss troops are going to be equipped with an automatic rifle which the specialists consider very good. Its inventor, who also built it, Colonel Furrer, Director of the Manufacture of Arms, supervised the recent tests made thereof which were witnessed by a number of officers and newspaper men—the enemy being simulated by manikins.

This automatic rifle fires a cartridge called "Regulation cartridge 1911" and has the appearance of an infantry rifle. It weighs 8 kilograms. Its barrage firing rate is 450 shots per minute, but it can also be used as an ordinary rifle, firing single shots at the rate of 50 to 60 per minute. An extra gun barrel can be substituted in less than 30 seconds, thus obviating all danger of heating. The gun is provided with 30 magazines of 30 cartridges each; the bullet has a muzzle velocity of 740 meters. New magazines can be adjusted while the rifle is being fired. For accurate fire, single shots, the rifle is provided with an adjustable support with prongs. As a whole, it is simple, strong and easily handled.

The tests were entirely conclusive. The dispersion of the projectiles was very small, especially in height. The following are the remarks of a witness of the tests:

"Finally, Colonel Otter, Director of the School of Practice of Wallenstadt, gave us an interesting demonstration of combat fire conducted by two lieutenant colonels. The large field was about covered with manikin targets in different formations, including machine guns sometimes difficult to detect. The simulated enemy was quickly overcome, including the machine gun targets at distances of 700 meters. The two officers fired with the rifle on two tripods, on one tripod, kneeling and standing. In whatever position they fired, the targets were hit rapidly. It was all over within twenty minutes."

There are two of these automatic rifles per section, i.e., eight per company. They are served by eight men transporting 1020 cartridges, with a further supply of 1440 cartridges in the section wagon and 720 in the company munition caisson.

This new arm, named after its inventor, Colonel Furrer, is considered as the best of its kind in Europe.

Let it be understood that "preparedness" means merely national security; that it is not a move to begin war, but to defend the United States in the event of war. The United States cannot maintain peace if an enemy is determined to have war; but the United States, if prepared, can make that enemy desire peace so badly as to sue for it. Then peace would be made upon the terms laid down by the United States, and it would be a permanent and satisfactory peace.—*Washington Post*.

COAST ARTILLERY BOARD NOTES

Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the Corps or of the service at large. These communications, with models or drawings of devices proposed, may be sent direct to the Coast Artillery Board, Fort Monroe, Virginia, and will receive careful consideration.—R. S. ABERNETHY, Colonel, C. A. C., President Coast Artillery Board.

New Projects Initiated During the Month of April

Project No. 336, Methods of Property Accounting.—Referred to Coast Artillery Board by Chief of Coast Artillery for study and recommendation.

Project No. 337, Method of Marking Equipment.—A copy of letter from President of the Board for marking equipment was referred to Coast Artillery Board for remark and recommendation. Study was made and report submitted March 27, 1925.

Project No. 338, Device for Plotting Dead Spaces.—This is a device gotten up by Mr. Merriam, formerly of Worcester Polytechnic Institute, for the plotting of dead spaces. It was referred to the Coast Artillery Board by the Chief of Coast Artillery for consideration and report. The Board has referred the device to the Commanding Officer, 51st Coast Artillery, for examination and comment.

Project No. 339, Comments on T. R. 435-60, "Sound Ranging Battery."—Referred to the Board by Commanding General, Third Coast Artillery District, for comment.

Project No. 340, Comments on T. R. 435-....., "Headquarters and Headquarters Detachment, Sound Ranging Service, G. H. Q. Reserve."—Referred to the Board by Commanding General, Third Coast Artillery District, for comment.

Project No. 341, Comment on T. R. 435-65, "Sound Ranging Service, G. H. Q. Reserve."—Referred to the Board by Commanding General, Third Coast Artillery District, for comment.

Project No. 342, Comment on T. R. 435-....., "Tactics of Sound Ranging."—Referred to the Board by the Commanding General, Third Coast Artillery District, for comment.

Project No. 343, 1917 MI Gun.—This test was initiated by the Coast Artillery Board to determine the suitability of the 1917 MI Antiaircraft Gun for service. The Board found that the gun and mount functioned satisfactorily in every way. The emergency sighting system used is to be made the subject of a separate report.

Project No. 344, Gliders for Use as Antiaircraft Targets.—The Coast Artillery Board was directed by the Chief of Coast Artillery to arrange with the Commanding Officer, Langley Field, for a preliminary test of gliders to determine their value as targets for antiaircraft artillery and machine guns. Only one glider was available and on April 8th the Board witnessed a flight of this glider. The glider was placed on the top wing of a training plane and released at an altitude of 5000 feet, requiring six minutes for descent. From the observations made by the Board, it is extremely doubtful that the glider will ever offer any possibilities as an antiaircraft target. It is so small that it cannot be seen until it has descended to 2000 to 2500 feet. The character of its descent cannot be compared to any type of bomber or observation plane which the Coast Artillery would encounter under service conditions. The spiralling of the target to the ground with its short turns and rapid dives might be considered similar to that of a high speed pursuit plane. The Board recommended that the question of the use of gliders as targets for antiaircraft guns and machine guns be left open pending design and test of later types of gliders.

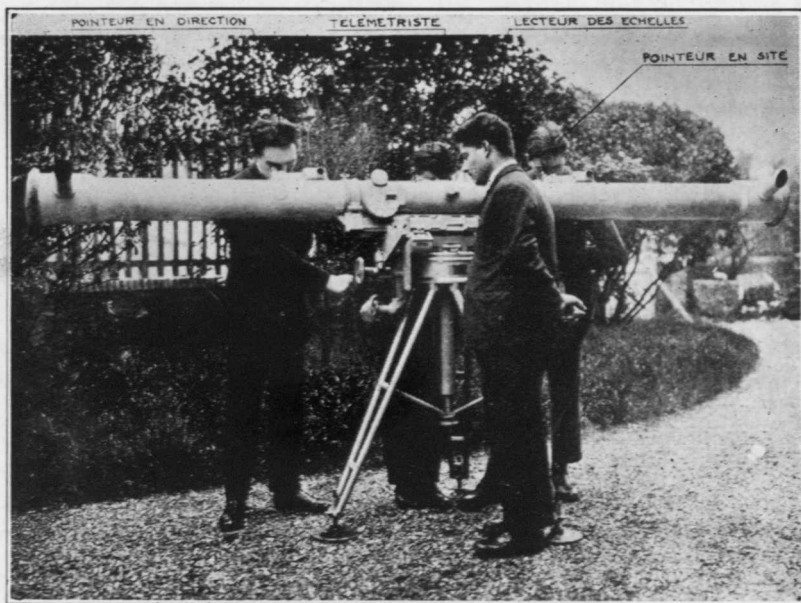


FIG. 1

Completed Projects

Project No. 219, The Stereoscopic Telemeter (Societe Optique et Precision de Levallois).

I—HISTORY.

1. The Coast Artillery Board was directed by the Chief of Coast Artillery (413.682/E2) to conduct a test of the Stereoscopic Telemeter manufactured by the Societe Optique et Precision de Levallois and to determine its value for use by the antiaircraft artillery. (See Fig. 1).

2. The instrument was delivered in June, 1924, by a representative of the Societe Optique et Precision de Levallois. The manufacturer's representative, M. Poisson, remained at Fort Monroe during the preliminary test for the purpose of explaining the use of the instrument and to place it in adjustment. In August during the preliminary test it was found that the observer's adjustment could not be maintained and this was reported to be due to the fact that one lens had worked loose. Moreover, the lenses had collected moisture and dirt. The Ordnance Department was requested to send an optical specialist to Fort Monroe to repair the instrument. In September, the Ordnance Department representative arrived and repaired the instrument. No trouble with the adjustment has developed since that time.

II—DESCRIPTION OF TESTS AND PRELIMINARIES.

3. The following facts and figures are given with reference to the instrument under test:

Length of base	3 metres
Magnifying power	25
Eyepiece ring	2 millimetres
Actual field	1° 45'
Inclination of eyepieces on the horizon	80°
Distance between eyepieces adjustable from	55 to 72 millimetres
Distance graduated from	1600 to 30,000 yds.
Altitudes graduated from	800 to 8000 yards
Magnifying power of sight pieces	8
Length adjustable sight	3 metres

Distinguishing feature—Relation of parts such that stereoscopic contact once established will not be lost while instrument follows target in elevation unless target changes altitude, so that the stereoscopic observer sees a target moving at constant altitude as though it were stationary.

4. After repair of the instrument a crew of three enlisted men and an officer, Lieutenant Waldo from Battery "B", 61st Coast Artillery, were detailed to assist the Coast Artillery Board in the test, which was interrupted October 1, 1924 by press of other duties and not resumed until December 20th. In the meanwhile it was necessary due to discharges and furloughs to start with a crew of three new men. In the training of personnel required to operate the stereoscopic altimeter it was decided that the entire crew should be made up of enlisted personnel because in war time the instrument will normally be operated by enlisted personnel, and its test using officer personnel would not be a fair service test.

5. As a result of several trials of different methods of training observers the following procedure was adopted:

a. Prior to selection of detail, the men available for the duty should all be tested for stereoscopic vision in the method hereafter prescribed and those having no stereoscopic vision at once rejected.

(1) Test for stereoscopic vision is made with Zeiss stereoscope in accordance with the directions furnished with the instrument.

b. From the men possessing stereoscopic vision select a detail of four men, all young, quick, alert, dependable, and displaying aptness in the use of optical instruments.

c. When the best observer has been developed he should, if practicable, be made a noncommissioned officer and be placed in charge of the instrument. One enlisted man duty of reader; one man vertical pointer and one lateral pointer.

d. Select stereoscopic observer by comparison of results obtained in further tests of the four men. *NOTE:* It will generally be found that out of every four men selected as indicated, one will make an excellent stereoscopic observer; one a medium observer, one a fair observer, and one will fail.

e. Training period required for personnel from four to eight weeks. *NOTE:* A man once trained as stereoscopic observer appears to retain his conception of the work so as to return to his former expertness very quickly after an absence.

f. During the instruction of stereoscopic observers the detail is trained in setting up the altimeter leveling the support and making adjustments and the individual correction setting for each man's eyes is noted. This can usually be accomplished during the first week.

g. The adjustments taught were those laid down by the manufacturer in his pamphlet.

6. The preliminary adjustments having been completed, the instrument is set up over a point from which four or five distant well-formed objectives can be seen. The true range to these objectives should be known; in the test the ranges used varied from 2640 to 8000 yards. During the first period of the ground test, accuracy is not necessary. The attempt is made to show the members of the crew the principles of stereoscopic vision at a definite range. During the preliminary test the reader must not be permitted to strain his eyes. The distance effect of changing the adjustment of the instrument is taught in this period, time required at least one week. The distances to the objectives are next accurately determined. Series of ten readings on known datum points are taken by each man and from a series of these values the distance correction is calculated. This part of the training will require roughly one to two weeks; at the end of this time the officer in charge of the detail should be able to determine the most suitable man for the stereoscopic observer and the adjustment required for his eyes and conditions of the day. It was found during the test that the first impression is the best. The observers should be trained to give the command "read" on the first impression. The ground work having been completed the detail should next be trained on aerial observation.

7. This training period requires a period of two or three weeks. During the first week the observer, the lateral pointer and vertical pointer should be trained to follow accurately and continuously an airplane, keeping the diamonds in the proper position for accurate reading by the observer. The altimetric attachment is not used for the first week's work. Upon completion of the preliminary training on aerial targets, an airplane flying at known altitudes should be tracked and a comparison made between the record obtained by the altimeters and that reported by the plane and the two records obtained used as a check against one another. The altimetric attachment is used. During the test conducted by the Board, the Type A, Model 1920 Altimeter was used as an additional check. *NOTE:* In this type of work provision should be made by the Air

Service to have the altimeter in the plane very carefully calibrated, otherwise errors as high as 7 or 8 per cent may be found in the altitude reported by the Air Service. With the altimeter carefully calibrated errors of not more than 1 or $1\frac{1}{2}$ per cent can be expected under known conditions.

8. During this period, the observer should not be permitted to use the system of continuous altitudes which the instrument will give, but must be made to obtain a new altitude on each reading. Readings every 15 seconds can be easily obtained and if desired a period of 10 seconds between readings is obtainable. Each day before using the instrument on aerial targets a well-defined point on the ground some distance off or the sighting lathe should be used to check the adjustment used by the observer; temperature and visibility are liable to affect his observation, and the officer in charge of the detail should be held responsible for the correction. However, during the period of test conducted by the Coast Artillery Board the adjustment used by the observer did not appear to vary materially with visibility conditions, hazy, fair or excellent. The instrument gave satisfactory results when used for night practice.

III—DISCUSSION.

9. Suitability of instrument in its present form.—The instrument in its present form appears, as a result of the test conducted by the Coast Artillery Board, to possess distinct advantages over the present long base type of altimeter. Its main disadvantages are of a structural nature which it is believed could be easily corrected.

10. *Advantages.*

a. The Stereoscopic Altimeter has a single station located at the range section. The location at this point saves from two to three hours work in measuring and orienting base lines, and obviates the communication system required with the present Type A Model 1920 Altimeter.

b. Targets can be designated more quickly, and in many cases targets that are visible to the battery commander from his position close to the range section but are invisible to the observers at B' and B" base line can be selected.

c. The instrument eliminates much of the confusion in the assignment of targets. A single plane of a formation can be assigned and tracked. This cannot be done with the present long base system.

d. The construction of the instrument enables it to maintain stereoscopic contact if it is desired after it has once been established and no change will be required so long as the altitude of the airplane remains sensibly constant. The effect of errors in the determination of altitude which may and will creep in may be minimized by taking separate stereoscopic readings every 10 or 15 seconds and disregarding discordant readings.

e. The instrument permits determination of correction for fuse setter range with some degree of reliability, without loss of altitude readings, that is, the determination for any string of shots (provided bursts are within 1° of target) of relative difference in range of burst and target.

f. The target can be designated and picked up quickly and altitudes furnished continuously to the R. A. Corrector. Planes were tracked at slant ranges up to from 27,000 to 30,000 feet and under exceptionally favorable conditions up to 45,000 feet. At this range the base end stations were unable to find the target, to say nothing of tracking it.

g. The time required for setting up the instrument is about the same as that required for setting up the R. A. Corrector. It can be taken down and put in traveling position in five minutes.

h. It is a mobile instrument that can be moved with the guns and range section, i.e., it possesses the same mobility as the other units in the battery.

11. Structural defects and suggested remedies.

a. The method of stabilizing the tripod is not entirely satisfactory. A modification of the method of holding the legs rigid is believed desirable.

b. The elevating mechanism should be housed and the friction drive replaced by a more positive drive.

c. The observer's eye-piece should be protected from his breath by proper design of the head-rest.

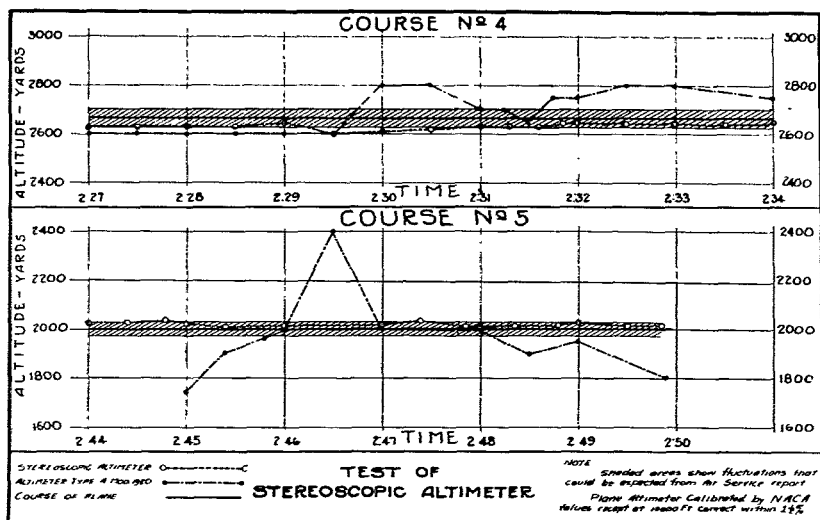


FIG. 2

d. A method should be provided for covering the objective lenses in transportation and storage.

e. The lighting system is not entirely satisfactory; plugs covering the lighting bulbs should be fastened to the telemetric tube by chains; wiring system made more rugged; and battery attached to the altimetric base.

f. Not enough tools are provided for the upkeep of the instrument in the field.

g. Carrying bars for the altimetric base would aid in transporting and setting up the instrument.

h. Removable clamps with handles should be provided for transportation of telemetric tube.

12. Figure 2 shows a comparison of the data furnished by the Stereoscopic Altimeter and by the base end station instruments with the altitudes reported by the plane over a period of two weeks extending from February 2 to February 13. During this period readings were taken each day and the stereoscopic instrument invariably gave better results than the base end stations.

13. The stereoscopic instrument was used by the 61st Coast Artillery for a period of two weeks before the Joint Air Service-Coast Artillery firing and gave satisfactory results throughout.

14. The Coast Artillery Board has been informed that a Bausch and Lomb Altimeter of the coincidence type and a stereoscopic instrument manufactured by the Societe D'Optique et de Mecanique de Haute Precision are to be purchased and sent to Fort Monroe for test. Tests should be made so as to obtain comparison with the stereoscopic telemeter now on hand.

IV—CONCLUSIONS.

15. It appears that in its present form, with the slight modifications enumerated under the discussion above, the Stereoscopic Altimeter is superior to the present type of two station altimeter not only in mobility and convenience of operation, but in accuracy under ordinary conditions.

V—RECOMMENDATIONS.

16. The Coast Artillery Board recommends:

a. That minor modifications outlined in paragraph 11 be kept in mind in connection with any future purchase of this instrument.

b. That the present stereoscopic altimeter be turned over to the 61st Coast Artillery (A.A.) for use during the coming target practice season in order to obtain more data with regard to its endurance under field service conditions.

c. That pending receipt and test of the Bausch and Lomb coincidence type altimeter and the stereoscopic instrument manufactured by the Societe D'Optique et de Mecanique de Haute Precision, no steps be taken as to definite adoption of an altimeter for service use.

d. The optics and mechanical construction of the Stereoscopic Altimeter, Societe Optique et Precision de Levallois, or of any type recommended for adoption, be carefully studied by mechanical and optical experts of the Ordnance Department before final decision as to purchase in numbers is made.

ACTION BY THE CHIEF OF COAST ARTILLERY.

The Coast Artillery Board has not received the action of the Chief of Coast Artillery on this project, but because of its general interest it is published for the information of the service in general, and the Antiaircraft Artillery in particular.

**It is one of the supreme compensations of life
to contemplate a worth while accomplishment.—
Warren G. Harding.**

BOOK REVIEWS

Preliminary History of the Armistice. Oxford University Press, 35 West 32nd Street, New York. 6¾"x 10". 163 pp. \$2.00.

Official documents published by the German National Chancellory by order of the Ministry of State. Translated by the Carnegie Endowment for International Peace, Division of International Law.

In attempting a review of this very interesting publication the reviewer finds himself in doubt not as to what parts should be quoted, but as to what quotable matter may be omitted.

The present volume as stated in the introductory note, "is history in the truest sense of the word," the aim of which is "merely to show what actually occurred."

The "preface" for which the German Chancellory is apparently responsible, is really a complete outline of events, and the remainder of the volume may be considered as exhibits. A number of extracts follow:

The starting point of the whole peace proceeding was the imperial conference at Spa on August 14, 1918. Although General Ludendorff had stated positively as late as the middle of July, 1918, that the offensive then in progress would result in a decisive defeat of the enemy, it was now agreed that it was no longer possible to win the war by military action, and therefore, an understanding with the enemy, by means of neutral mediation, must be considered. But the immediate opening of negotiations for this purpose was not deemed necessary. On the contrary, the Emperor's decision was to the effect that "we must prepare to seek the opportune moment for coming to an understanding with the enemy," and it was thus that the Imperial Chancellor summed up the conclusions of the conference: "Diplomatic feelers must be thrown out at an opportune moment preparatory to an understanding with the enemy. Such a moment might present itself after the next successes in the west." In addition General Field Marshal von Hindenburg expressed the opinion "that it would be possible to remain fixed on French territory, and thereby in the end enforce our will upon the enemy."

Only on the 10th of September did this view undergo a partial alteration. General Field Marshal von Hindenburg still voiced his opposition to an appeal to all the belligerent nations, but stated that he now "agreed to the mediation of a neutral power for the purpose of bringing about a parley without delay."

On the 21st of September the idea of a direct approach to America upon the subject of inaugurating peace negotiations was first set forth.

During these days the proceedings entered upon a new stage. While the Supreme Army Command had originally flatly objected to the inauguration of any steps toward peace before a consolidation of the military situation had been effected, and had subsequently advised caution, it now began to beg most insistently that the peace proposals be sent out at once, on account of the acute danger of the military situation. On the first of October a whole series of telegrams and telephone messages, all on the same subject, arrived at Berlin from General Headquarters. "Today the troops are holding their own; what may happen tomorrow cannot be foreseen."

The peace proposals "should be issued at once, and not be held back until the formation of the new government, which might be deferred."

Prince Max most strenuously opposed the required peace move, as, in such a form and at the moment of such an embarrassing military situation, it would plainly have a most unfavorable effect on Germany's position in peace negotiations.

After an exhaustive discussion between the Secretaries of State, the note, under this pressure from the Supreme Army Command, was sent out during the night of October 3-4.

Wilson's answer was dated October 5. It demanded a closer adherence to the President's points so that at the opening of a discussion, an arrangement could be found for the practical details of their application. Further, the evacuation of territory occupied by Germany was demanded, and, thirdly, a question was put as to the authorities in control of Germany.

On October 9, an oral communication with Ludendorff took place, in which he briefly reviewed the entire history of the war. At this interview, Colonel Heye again declared that "it will be gambling with fate on the part of the Supreme Army Command, if it does not press forward the peace move; we may be able to hold out until spring, but a turn for the worse may come any day. Yesterday the question of a break through our lines hung on a thread."

The German reply to Wilson's answer was sent in complete agreement with the Supreme Army Command. Upon the desire of General Field Marshal von Hindenburg, it was distinctly declared that Germany was proceeding on the assumption that the powers associated with the United States would also uphold the principles of President Wilson.

President Wilson's second note of October 15, was materially more severe. * * * The consternation caused all over Germany by this note, and especially its effect on the army, were obviously very great. Opposition was aroused everywhere, pride was touched, and the Supreme Army Command wanted to retract.

The relations between the Supreme Army Command and the Government were now reversed. The Supreme Army Command wanted to know whether the mass of the German people would once more go into a struggle to the bitter end, or whether its power of moral resistance had been too completely exhausted to do so. Secretary of State Dr. Solf saw in this communication not only an appeal to the German people, but also a shifting of responsibility.

On the 17th of October three sessions were held. * * * Ludendorff expressed himself as more hopeful than he had been two weeks before regarding the possibility of standing firm for the next few weeks.

At the close of the session, the Imperial Chancellor's train of thought was clearly seen. He pointed out that according even to Ludendorff's most sanguine hopes—hopes not shared by the Prince himself, apparently—the war could be continued only for a limited time; that in the meantime the defection of the only two remaining allies had to be reckoned with, and that now the question arose: Whether at the finish we would be in a better or a worse position than at present?

The conference was continued in the subsequent third session of October 17. In the meantime, bad news had arrived from Austria. Otherwise conditions remained the same.

On October 20, Hindenburg sent the following telephone message: " * * * But even if we should be beaten, we should not really be worse off than if we were to accept everything at present."

In Wilson's third note of October 23, 1918, the President repeated the reference to his message of January 18, 1918, and to his subsequent message. He stated that he had proposed to the other governments, in case they should be inclined to bring about peace on the conditions and principles suggested, to take steps toward the conclusion of an armistice.

The note concludes with more or less lengthy arguments in which the President again expresses doubt concerning the state of governmental authority within Germany.

Following this note, the documents dealing with the abdication of the Emperor and the Crown Prince increase in number.

On October 28, Generals von Mudra and von Gallwitz arrived. They gave as their opinion that every possible means must be made use of to prove that matters were not quite at their worst.

A fruitless exchange of telegrams with Vienna for the purpose of preventing a separate peace, and the news of the Turkish armistice followed. * * * In the meantime the quiet policy of the logical continuation of the irrevocable step taken on the 3rd of October attained one important result. The Lansing note arrived, in which it was expressly stated that the Allied Governments had accepted Wilson's points as a basis for the final compact of peace, with two clearly defined exceptions.

The conclusion of the armistice ensued. The conditions attending the cessation of the struggle were excessive. But no refusal was possible. The road taken upon the 3rd of October had to be followed to the end. * * * At this stage no further differences of opinion with the Supreme Army Command existed. On November 10, the latter sent a wire signed by Hindenburg simultaneously to Berlin and to the Armistice Commission negotiating with Foch, stating on what points an attempt must be made to obtain a mitigation of the conditions. The telegram ended with the words: "If it is impossible to gain these points, it would nevertheless be advisable to conclude the agreement." In case of the refusal of points 1, 4, 5, 6, 8, 9 a fiery protest should be made, and an appeal addressed to Wilson."

Enough has been quoted to indicate the content of the volume. But there remain many interesting pictures of the German political and military situation and the peculiar psychology of the German governing class.

William Hohenzollern appears in but one conference—the first. It cannot be said that he took a decided stand on this occasion. Elsewhere in the text he appears in an attempt to dissuade the Austro-Hungarian monarch from seeking a separate peace, and in the suggestion that possible German rejection of armistice conditions should not cause cessation of efforts for peace. While some mention is made of political agitation for abdication, there is an inexplicable omission of the events immediately preceding and leading up to the abdication and flight.

It may be said that there is a definite hiatus between the receipt of the fourth Wilson note (dated November 3) and the announcement of the armistice terms. And it cannot be denied that "history in the strictest sense of the word" was made during these days.

The American reader will be interested to note the effect of American military achievements. He will search in vain for any echo of the St. Mihiel action, will find the German High Command somewhat encouraged by the early checks in the Argonne, but will discover no direct reference to the Meuse-Argonne offensive towards Sedan. The following will prove of interest:

STATEMENT OF BARON VON DEM BUSSCHE, OCTOBER 2.

The enemy is enabled to make good his losses through the assistance of America. The American troops, as such, are not of any particular value or in any way superior to our own. Where they have gained preliminary successes by mass-attacks, they have been held back despite their numerical superiority. An important factor, however, has been that they could take over long stretches of the front and thereby enable the English and the French to relieve their own war-trained troops and to acquire almost inexhaustible reserves.

STATEMENT OF LUDENDORFF, OCTOBER 17

The Americans must not be rated too highly. They are pretty dangerous, but up to the present we have beaten them back. They make a difference to the relative number, it is true, but our men do not worry about the Americans; it is about the English. Our Army must be relieved of the feeling of isolation.

Whatever else may be said of the American participation in the victory, this volume leaves no doubt as to the devastating effect of the Wilson diplomacy upon the German plans for evasion of the consequences of defeat. And yet we find this in the "preface":

Wilson was the most popular man in the whole country (Germany) and the people, despite the severity of the armistice, trusted in the establishment of an ultimate peace through the impartial application of his principles.—R. S. A.

A Reader's Guide Book. By May Lamberton Becker. Henry Holt and Co., New York. 5"x 7". 374 pp. \$2.75.

After reading sections of Mrs. Becker's Guide Book one wonders how she collected the vast amount of information found therein. If you wish to read a historical novel of the pioneer days, a novel about gypsies, or a book on how to behave, going to Italy, International finance, or the Einstein theory, or if you wish to collect a bride's bookshelf or teach French to little children—in fact, if you wish to know anything about books to read—Mrs. Becker has collected and assembled in readable form just about what you need in the form of suggestions.—C. S. H.

Admiral de Grasse. By Canon Max Caron. The Four Seas Company, Boston. 4¾"x 7¼". 253 pp. Price, \$2.50.

When the allied French and American forces surrounded and captured the British force under Cornwallis at Yorktown, Admiral de Grasse commanded the French fleet in the Chesapeake. It was he who brought 3000 French troops from San Domingo to reinforce Washington and Rochambeau; it was he who furnished for the siege the heavy artillery and 800 naval gunners; it was he who bottled up Yorktown, turned back to the high seas succor from the British, and prevented the escape of Cornwallis. In a letter to the French Admiral, Washington said, "Your timely intervention has given to America independence and liberty."

This story of his life is written by a French priest. The author rambles to relate incidents portraying the relations that existed between the French people and the young American Republic. His ramblings, however, are rather interesting. "To the valiant Americans who came to bring us victory, these pages are inscribed. It is the history of the great Frenchman who, long ago, carried liberty to them." The style is quite simple and the book should prove interesting to the Americans, to whom it is dedicated.—C. S. H.

Air Power and War Rights. By J. M. Spaight. Longmans, Green and Co., London. 478 pages and index. Price \$8.50.

Mr. Spaight has delved deeply into the history of aviation in the late war and the information acquired is utilized by him in presenting most admirably the question of the future use of the aerial arm as effected by considerations of international law and rules of aerial warfare. His attitude is entirely judicial. He treats allied and entente aviation alike, utilizing only the truth where such may be ascertained and directing attention to the injustices done both sides in the misrepresentation of facts for political or morale reasons. His store of incidents and experiences quoted, while ancillary to the main purpose of the book, certainly makes it an interesting and instructive work from an historical viewpoint.

To the Coast Artilleryman, interested as he is in antiaircraft matters, Mr. Spaight's book will be of particular value, showing as it does, not only the probable future international laws for the regulation of the use of aircraft, but also

the future strategic utilization of that arm. His conclusions as to future uses of aircraft are revolutionary and astounding. Should he be correct, our antiaircraft troops with the armies will have a sinecure—all will be concentrated in civilian areas and the protection of personnel will be entirely subordinate to the protection of materiel, and largely civilian materiel at that.

Will it be in accord with the rules of aerial warfare for an airplane to use incendiary bullets for the destruction of balloons? To drop propaganda? What rights has an aviator captured out of uniform? What are the rights of an aviator landed in hostile or neutral territory and of the civilian populace that may attempt to apprehend him? The treatment of the innumerable questions similar to these that have arisen and will arise in the future is fascinating both because of the information and instruction furnished and the style of presentation. Those who have any interest whatever in the development of aviation for use in war will be well repaid by a careful study of "Air Power and War Rights."—B. F. H.

The Art of Helping People Out of Trouble. By Karl de Schweinitz. Houghton, Mifflin Co., New York. 5¼" x 6". 231 pp. \$2.00.

All of us have been in trouble ourselves and have seen others in trouble. Often we have tried to help those we knew were in trouble. In some cases we were successful; in others we failed. Had we previously read this book our percentage of successes would undoubtedly have been larger.

The author, in fourteen chapters, gives good advice, most of which is illustrated by actual cases from life.

The book is necessarily interesting, since it is well written and deals with human nature.

Each reader of the work will have provided himself with an additional means of increasing not only his own happiness, but also the happiness of those with whom he comes in contact.—H. B. H.

What Is Man. By J. Arthur Thomson. G. P. Putnam's Sons, New York. 6¼" x 8½". 331 pp. \$2.00.

Professor Thomson needs no introduction, as he is well remembered for his splendid work as editor of "The Outline of Science."

The proper study of Mankind is man, and the author has outlined for the general reader, in a series of lectures known as the "Thomson Lectures," the nature of man as an organism and social person.

A book of this type, covering a vast field of study, is most valuable when in addition to clearness, it places proper emphasis at the right points, and in this Professor Thomson has succeeded.

Anyone desiring a clear and concise statement of what there is scientific ground for believing about man's origin, his development in the past and possible development in the future, will find this work of interest and value.—E. H. W.

Man and Mystery in Asia. By Ferdinand Ossendowski. E. P. Dutton, New York. 1924. 6" x 8¾". 343 pp.

Dr. Ossendowski's "Man and Mystery in Asia" does not rise to the heights he attained in "Beasts, Men and Gods." Nevertheless, it is a book from which the reader can derive enjoyment and instruction. To one interested in present conditions in Far Eastern Russia, the characters in the book will aid one to understand how the conditions now prevalent could have arisen. The book contains varied adventures which will hold the interest of the type of reader who desires action.—D. D. H.

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<i>F-10</i>	Revue d'Artillerie.	<i>US-27</i>	Field Artillery Journal, The.
<i>F-12</i>	Revue Militaire Generale.	<i>US-30</i>	Infantry Journal, The.
<i>UK-2</i>	Army Quarterly.	<i>US-38</i>	Coast Artillery Journal.
<i>UK-8</i>	Engineer, The.	<i>US-39</i>	Cavalry Journal.
<i>UK-11</i>	Journal of the Royal Artillery.	<i>US-41</i>	Military Engineer.
<i>UK-13</i>	Journal of the Royal United Service Institute.	<i>US-43</i>	Military Surgeon.
<i>UK-14</i>	Journal of the United Service Institute of India.	<i>US-52</i>	Popular Mechanics.
<i>UK-21</i>	Royal Engineers Journal, The	<i>US-59</i>	Proceedings of the U. S. Naval Institute.
<i>US-7.5</i>	Army Ordnance.	<i>US-60 5L</i>	Quartermaster Review.
<i>US-16.5</i>	Chemical Warfare.	<i>US-65</i>	Scientific American Monthly.
		<i>US-77</i>	Wireless Age.
		<i>US-78</i>	U. S. Air Service.

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Main battery elevations and fighting aircraft.—*US-59*, 1925.

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